Digital Arizona

Arizona Public Safety Broadband Program

First Responder Network Authority (FirstNet)

Data Collection and Analysis

Submitted September 30, 2016 to:

First Responder Network Authority

12201 Sunrise Valley Drive
Mail Stop 243
Reston, Virginia 20192

Digital Arizona
Arizona Public Safety Broadband Program

Arizona DOA, Office of Grants and Federal Resources – Matthew Hanson, Statewide Grant Administrator
100 North 15th Ave., 4th Floor, Phoenix, AZ 85007

Prepared for Arizona Department of Administration by Mission Critical Partners, Inc.

TABLE OF CONTENTS

EXECUTIVE SUMMARY

In early 2015, the First Responder Network Authority (FirstNet) notified the single point of contact (SPOC) in each of the 56 states and territories of the initiation of the data-collection effort to support the planning of the Nationwide Public Safety Broadband Network (NPSBN). The State of Arizona subsequently initiated its data-collection effort, but due to unforeseen circumstances, the effort resulted in only a limited amount of data being collected and submitted to FirstNet on September 30, 2015.

In accordance with the guidance and direction provided by FirstNet, data pertaining to the following subject areas was collected and submitted:

1. **Coverage:** Identify desired coverage within the state or territory and the proposed build-out phases.
2. **Users and Operational Areas:** Gather information on the eligible user base and the users' respective operational areas.
3. **Capacity Planning:** Estimate current data usage today from typical users with indicators of potential growth.
4. **Current Providers/Procurement:** Identify current service providers and plans, procurement vehicles, and barriers to adoption.
5. **State Plan Decision Process:** Document the final state plan review process prior to submission to the Governor, as well as any potential barriers/issues of which FirstNet should be aware.

In January 2016, FirstNet released a request for proposals (RFP) seeking a nationwide partner for the construction and operation of the NPSBN. Responses to the RFP were due in May 2016. As of the date of this report, three entities have publicly acknowledged submitting a response to the RFP: Rivada Mercury; AT&T; and Code 3 Broadband. The data collected and submitted in September 2015 was made available to all RFP respondents for formulation of their state deployment plans as part of their RFP responses. The RFP responses currently are being evaluated by FirstNet, with a contract award anticipated in early November 2016.

In early 2016, FirstNet announced that it would accept an additional submission of data if states wanted to participate in another collection effort. The new data submission is due September 30, 2016, but will not be used in any regard concerning the responses to the FirstNet RFP. Instead, this effort may be used by FirstNet's selected partner to further refine state plans, if deemed fiscally viable. The Arizona Public Safety Broadband team elected to engage in this supplemental data collection effort in an attempt to further identify and refine the State's NPSBN requirements.

An online survey was developed and disseminated to public safety agencies across the State. The survey was modeled after the survey contained in the mobile data survey tool (MDST) on the Interoperable Communications Technical Assistance Program (ICTAP) website, designed by the Office of Emergency Communications (OEC) of the U.S. Department of Homeland Security (DHS). The survey contained supplemental questions concerning coverage priorities, local requirements, and current levels of land mobile radio (LMR) coverage that were not part of the MDST survey. This document contains the results of this effort. The survey was distributed in two parts; one survey was just for Tribal public safety agencies, and the other survey was for non-Tribal public safety agencies. The Tribal and non-Tribal surveys were identical in construction and content. Conducting the survey in this manner enabled the unique needs of the Arizona Tribal public safety community to be captured. The survey results in this document are depicted with the

Tribal results in one chart, and then the combined Tribal/non-Tribal results in a second chart. A total of 69 public safety agencies responded to the survey, including seven Tribal public safety agencies. Please refer to Appendix 1 and Appendix 2 for a list of participating agencies. In addition to this document, the raw data also will be submitted to FirstNet in the form of Microsoft Excel spreadsheets. The data is reflected in this document predominantly in the form of charts and graphs for ease of reading and interpretation.

In addition to survey data, a request was sent to all public safety answering points (PSAPs) requesting calls-for-service (CFS) location data for a recent 12-month period. A total of 36 PSAPs submitted CFS data, which is depicted in Section 3.1.

The data collected serves to provide greater clarity regarding issues concerning the number of devices currently deployed, current wireless services and costs, current barriers to implementation, application usage and applications desired, and current procurement methods. The data did not significantly alter the requirements of the Arizona public safety community in terms of network deployment priorities. Survey respondents still give the highest priority to coverage for critical infrastructure and major highways, followed by rural areas, suburban areas, and lastly urban areas.

However, the data provides much insight about the requirements of the Arizona public safety community for deployment of the NPSBN, including competitive price points, number of anticipated devices, coverage needs, current procurement processes, and anticipated barriers. The State of Arizona looks forward to meaningful discussions with FirstNet and its partner in developing and finalizing the network deployment plan for the State.

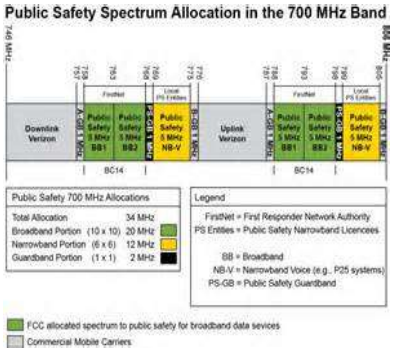
1. INTRODUCTION

In February 2012, the Middle Class Tax Relief and Job Creation Act (Act) was signed into law. The Act, among other things, created the First Responder Network Authority (FirstNet) as an independent authority within the National Telecommunications and Information Administration (NTIA). FirstNet was given the license to 20 MHz of spectrum within the 700 MHz band and charged with constructing a Nationwide Public Safety Broadband Network (NPSBN) dedicated to public safety's data needs. The network is expected to be built across all 50 states, plus six territories, and will be ubiquitously interoperable from one jurisdiction to the next. The massive planning efforts for the network have been taking place since the date of the Act, and are expected to continue through 2022, which is when the Act mandates that the network is to be functional.

The law that established FirstNet requires it to consult with local, state/territory, tribal, and federal public safety entities to ensure that the NPSBN is designed to meet the needs of public safety across the country, and that the network is financially self-sustaining. The law requires FirstNet to deliver a state plan to each governor regarding FirstNet's strategy to deploy the NPSBN's radio access network (RAN) within the respective state or territory. In order to carry out this consultation-and-planning process, each state and territory was asked to designate a single point of contact (SPOC) for the project. The SPOCs are responsible for coordinating the planning efforts in their respective state/territory, and for being the primary interface with FirstNet throughout the planning process.

Originally, the planning process was divided into two phases. Phase 1 consisted largely of education and outreach efforts to inform and educate as many stakeholders as possible about the network and its purpose, as well as to gather stakeholder feedback regarding their requirements for the network. The Act itself included the provision that FirstNet "enter into agreements to utilize, to the maximum extent economically desirable, existing (A) commercial or other communications infrastructure; and (B) Federal, State, tribal, or local infrastructure." Therefore, it initially was anticipated that a substantial amount of Phase 2 data collection would be focused on developing a database of existing state/local, carrier and other infrastructure and resources that might be leveraged to construct the NPSBN. However, FirstNet examined the practicality and usefulness of existing state and local infrastructure, and concluded that in many cases this may not be the most practical or cost-effective approach to network development.

FirstNet is seeking information on the following topics:



1. **Coverage:** Identify desired coverage within the state or territory and the proposed build-out phases.
2. **Users and Operational Areas:** Gather information on the eligible user base[1] and the users' respective operational areas.
3. **Capacity Planning:** Estimate current data usage today from typical users with indicators of potential growth.
4. **Current Providers/Procurement:** Identify current service providers and plans, procurement vehicles, and barriers to adoption.

[1] SPOCs should refer to FirstNet's preliminary definition of "public safety entity" to understand who may be considered a potential user of the network. First Responder Network Authority Proposed Interpretations of Parts of the Middle Class Tax Relief and Job Creation Act of 2012, 79 Fed. Reg. 57058, 57060 (September 24, 2014) *available at* http://www.gpo.gov/fdsys/pkg/FR-2014-09-24/pdf/2014-22536.pdf.

5. **State Plan Decision Process:** Document the final state plan review process prior to submission to the Governor and any potential barriers/issues of which FirstNet should be aware.

FirstNet is working through the SPOCs to gather inputs and data from key stakeholders in order to accurately define user requirements and to develop accurate information regarding users' current and future wireless broadband needs, as well as network adoption rates.

Coverage Objectives
This data would be used to determine the areas where the state/territory would require coverage. This data would consist of elements such as population centers, critical infrastructure, highways, public safety calls-for-service (CFS) locations, schools, hospitals, and any other elements deemed by state or local officials important enough to be considered for NPSBN coverage. This information can be utilized to establish the plan for the phased construction of the network; FirstNet has stated that the network construction will take place in multiple phases. How those phases will be developed could be influenced strongly by the coverage objectives collected and documented by the State.

Users and Operational Areas
This data consists of the potential number of public safety users of the NPSBN, the areas in which those users operate, and the number of broadband devices those users currently utilize and could potentially utilize on the NPSBN.

Capacity Planning
This data is critical for networks in areas of high-density users. This typically would be in the urban and suburban areas, but also in areas that see a foreseeable spike in user density for special events, such as professional or college sporting events, tourist areas, and seasonal events such as festivals. In addition to the number of users in a particular area, it is also important to ascertain the types of applications they currently use, as well as the amount of data they currently utilize. This information will help network designers to determine the appropriate amount of infrastructure to deploy in particular locations, in order to ensure adequate coverage and capacity.

Current Services
This data identifies current services being utilized by public safety agencies, their cost, and the procurement methods used to obtain them. This will provide insight into the number of agencies currently utilizing commercial mobile broadband, as well as the structure and cost of those plans. FirstNet and the states/territories can leverage this information to formulate a business model for plan and price offerings, in order to be competitive with the current commercial offerings.

2. METHODOLOGY

An online survey was developed and disseminated to most of the public safety agencies across the State. The survey was developed based upon the data elements collected by the MDST survey developed by the OEC. The survey was disseminated in two parts: Tribal and non-Tribal. Both parts were identical in content, but allowed for the separate collection of Tribal requirements. In addition to surveys, a request was sent to PSAPs across the State requesting CFS location data for a recent 12-month period. The State also collected critical infrastructure key resources (CIKR) from across the State, as well as local coverage requirements. The CFS and CIKR data was placed on a geographic information systems (GIS) map and compared against anticipated FirstNet baseline coverage.

All of the data is displayed in the form of charts and graphs, or on maps, for ease of reading and analysis.

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3. FINDINGS

3.1. COVERAGE OBJECTIVES

Figure 1 below depicts FirstNet's coverage-objectives baseline map for Arizona. Areas colored in red (high concentration), blue (moderate concentration), and green (low concentration) are the areas where FirstNet contemplates providing NPSBN coverage based upon factors it considered, such as population and infrastructure. These areas may or may not receive terrestrial-based coverage depending on how the final plan is developed. The State's data-gathering effort focused on identifying the areas outside of the anticipated FirstNet coverage where user needs necessitate a more prioritized deployment for FirstNet, based on critical infrastructure, seasonal populations, special-event locations, or other locations that may not have been considered based on the data available to FirstNet.

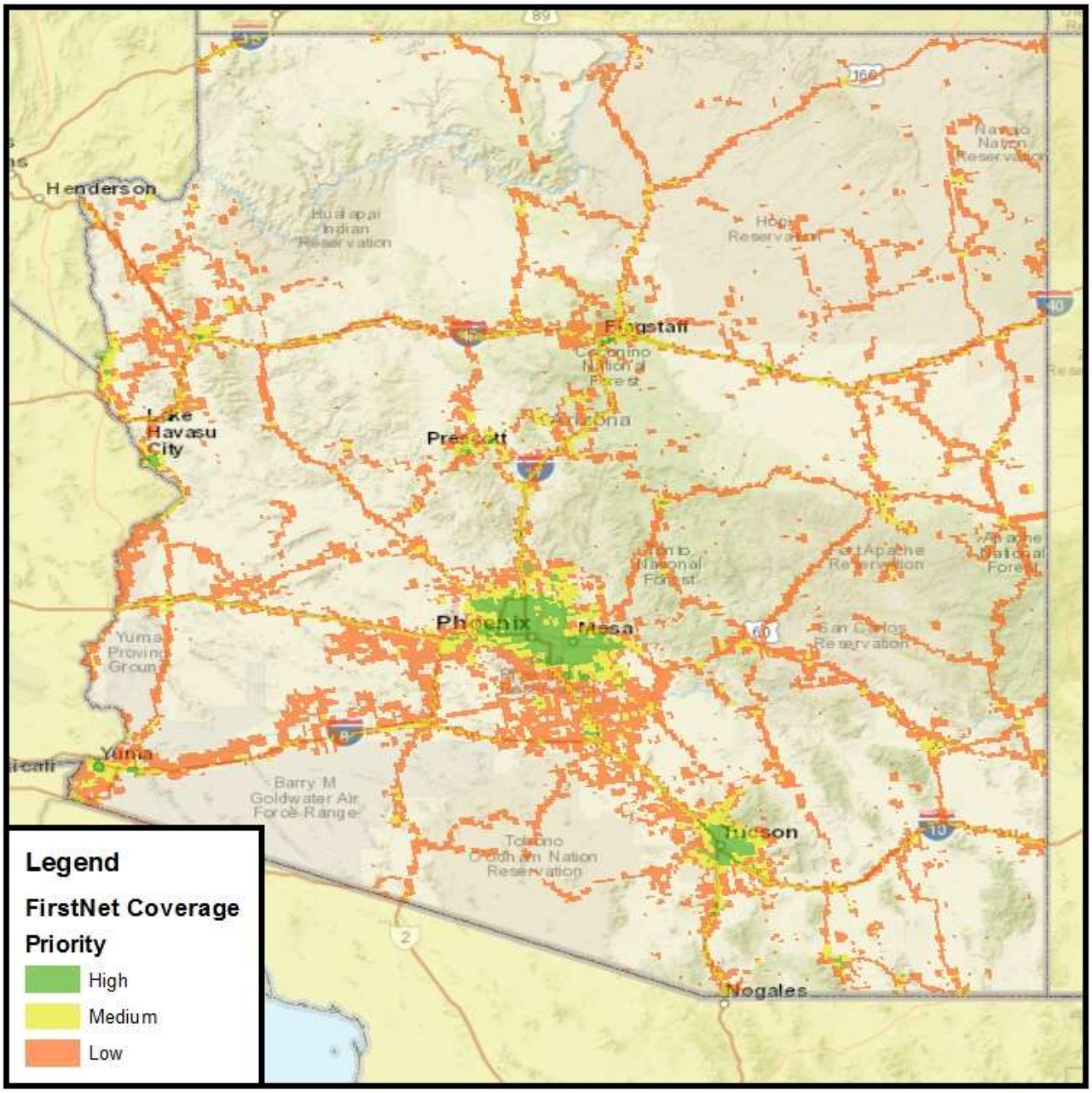


Figure 1: FirstNet Preliminary Coverage Objectives for Arizona

Part of the data-collection effort involved collecting CFS data for a recent 12-month period. Calls for service were received from 36 public safety answering points (PSAPs). In addition to calls for service, the following data elements also were collected: high-visitation areas, public safety agency locations, special events, and critical infrastructure. Specific critical infrastructure included bridges, canals, lakes, mines, airports, high-tension power lines, railroads, dams, power plants, schools, military facilities, correctional facilities, wildfire risk areas, natural gas pipelines, communication towers, healthcare facilities, ports of entry, and hazardous material (hazmat) storage facilities. All of these elements were placed on a GIS map and are depicted in the maps below (Figures 2-6). The data is displayed for the entire state, and then broken down into four regions: northeast, northwest, southeast, and southwest.

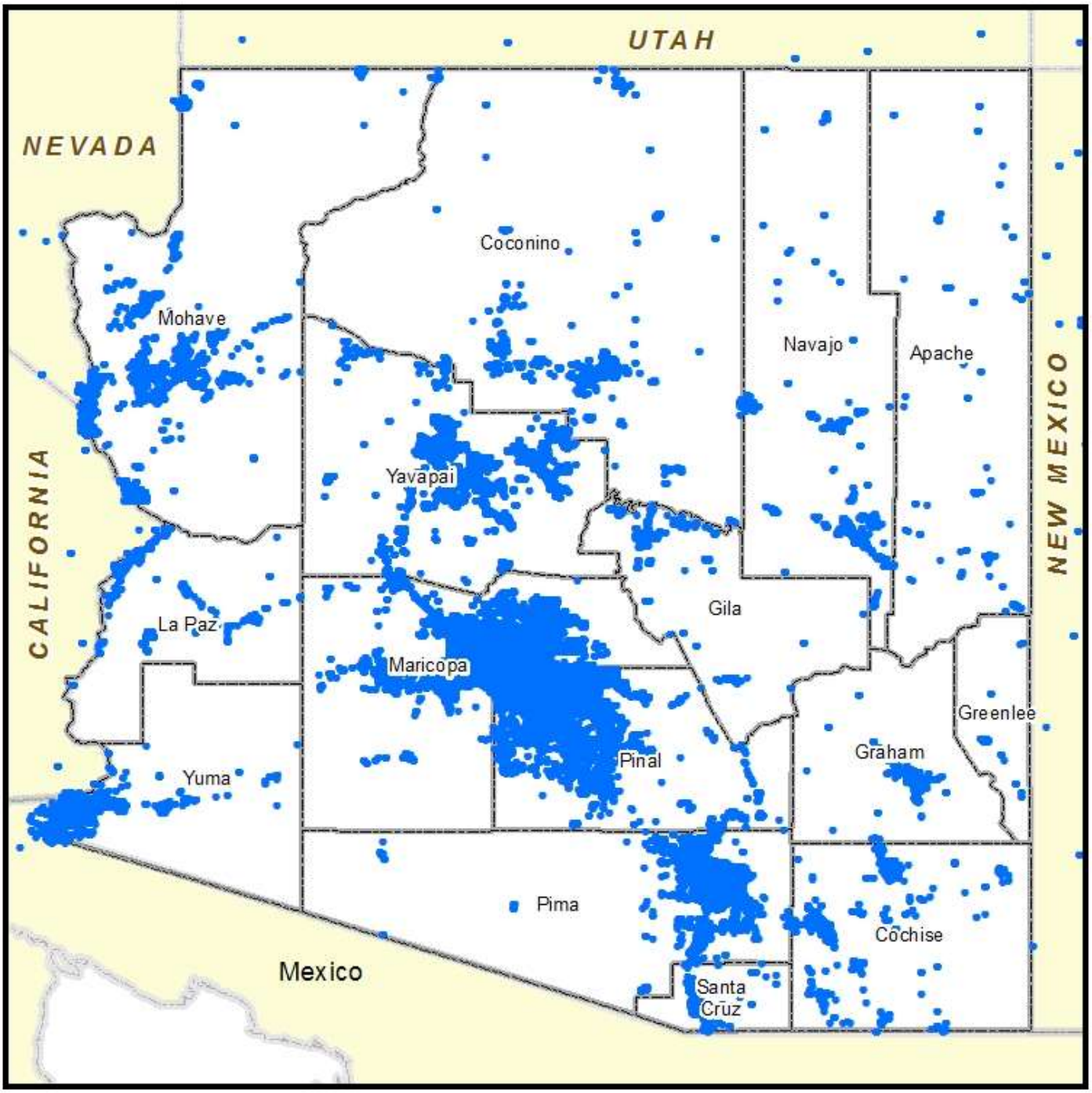


Figure 2: All Data Elements – Statewide

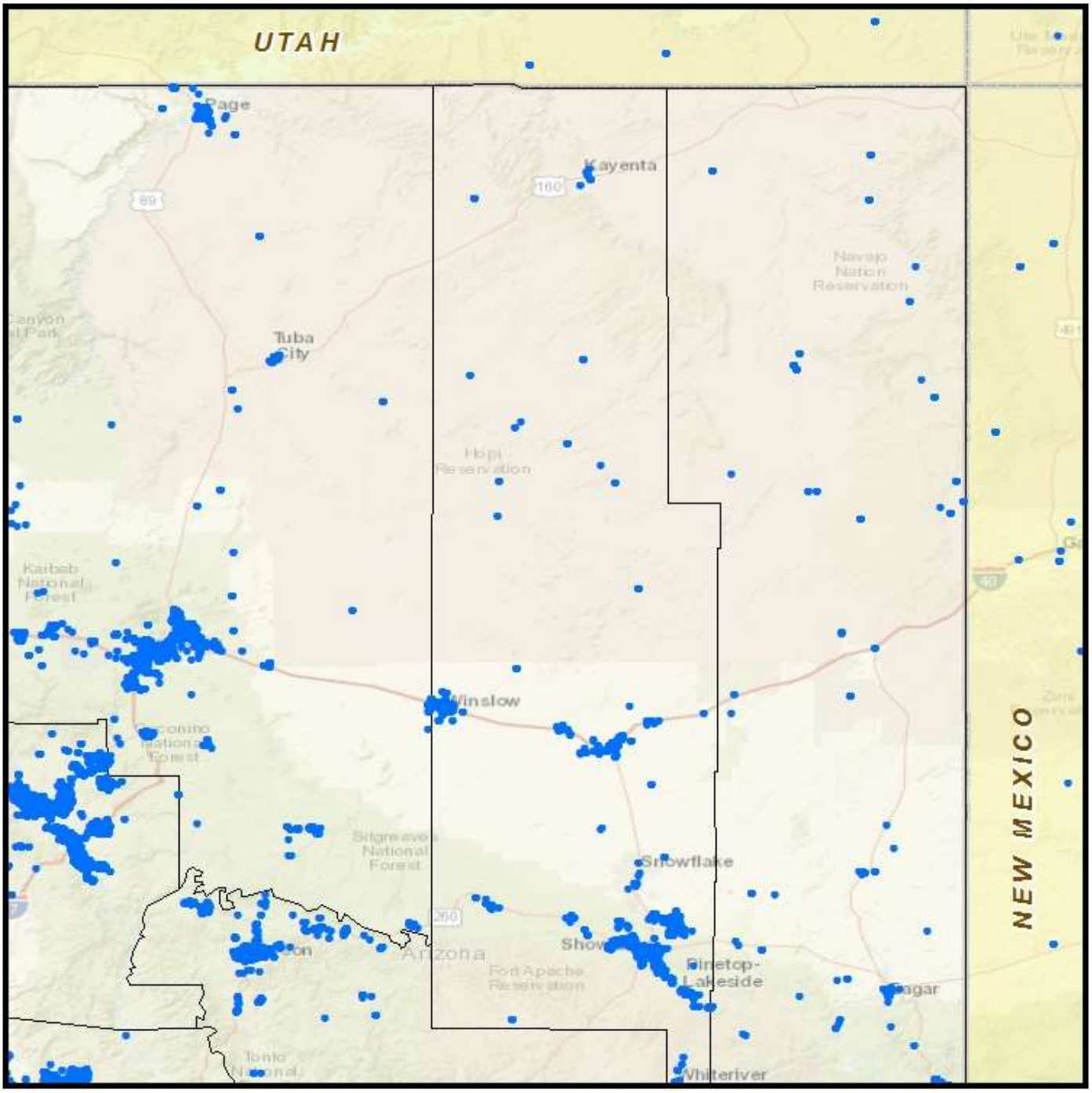


Figure 3: All Data Elements – Northeast Arizona

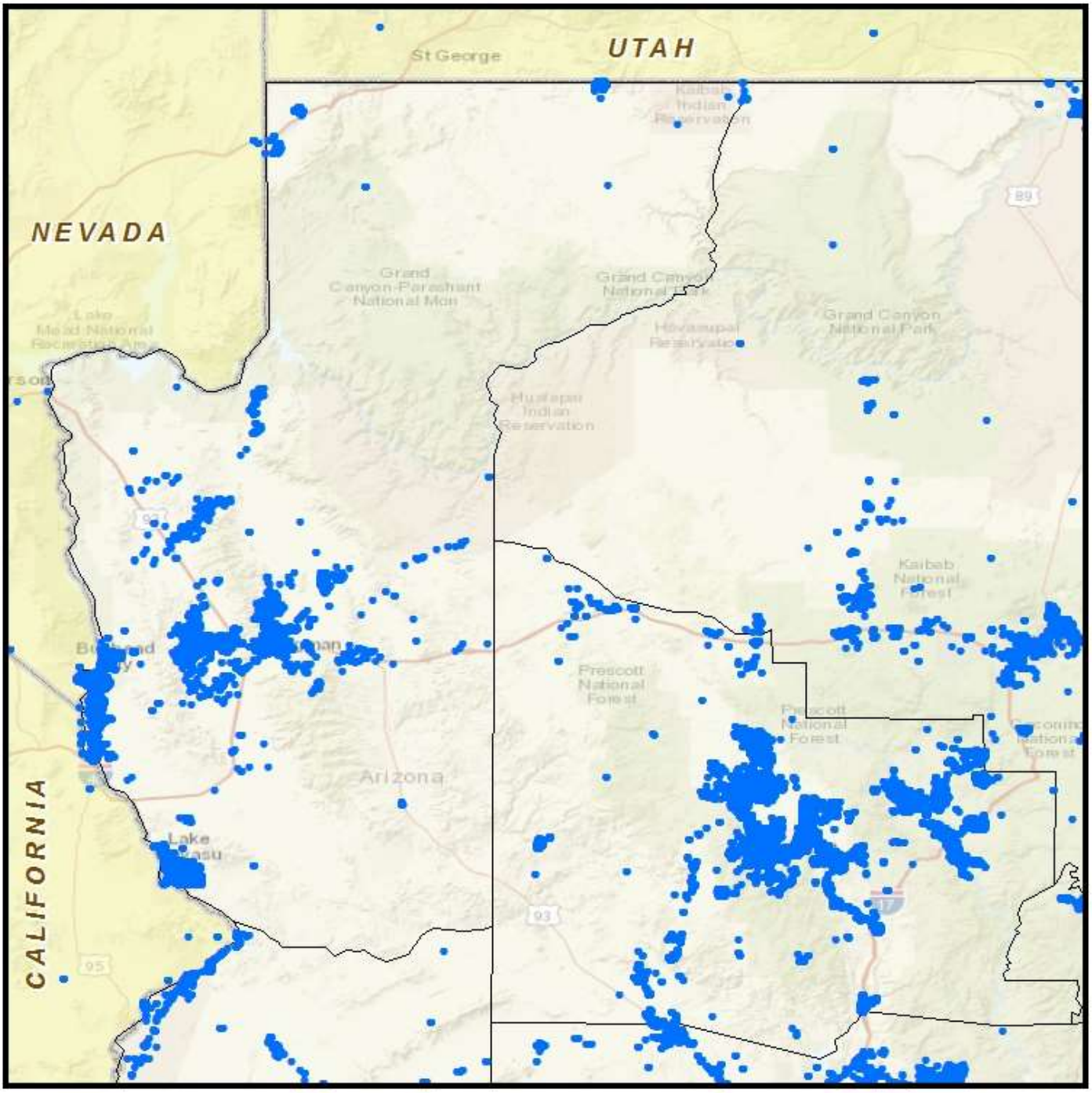


Figure 4: All Data Elements – Northwest Arizona

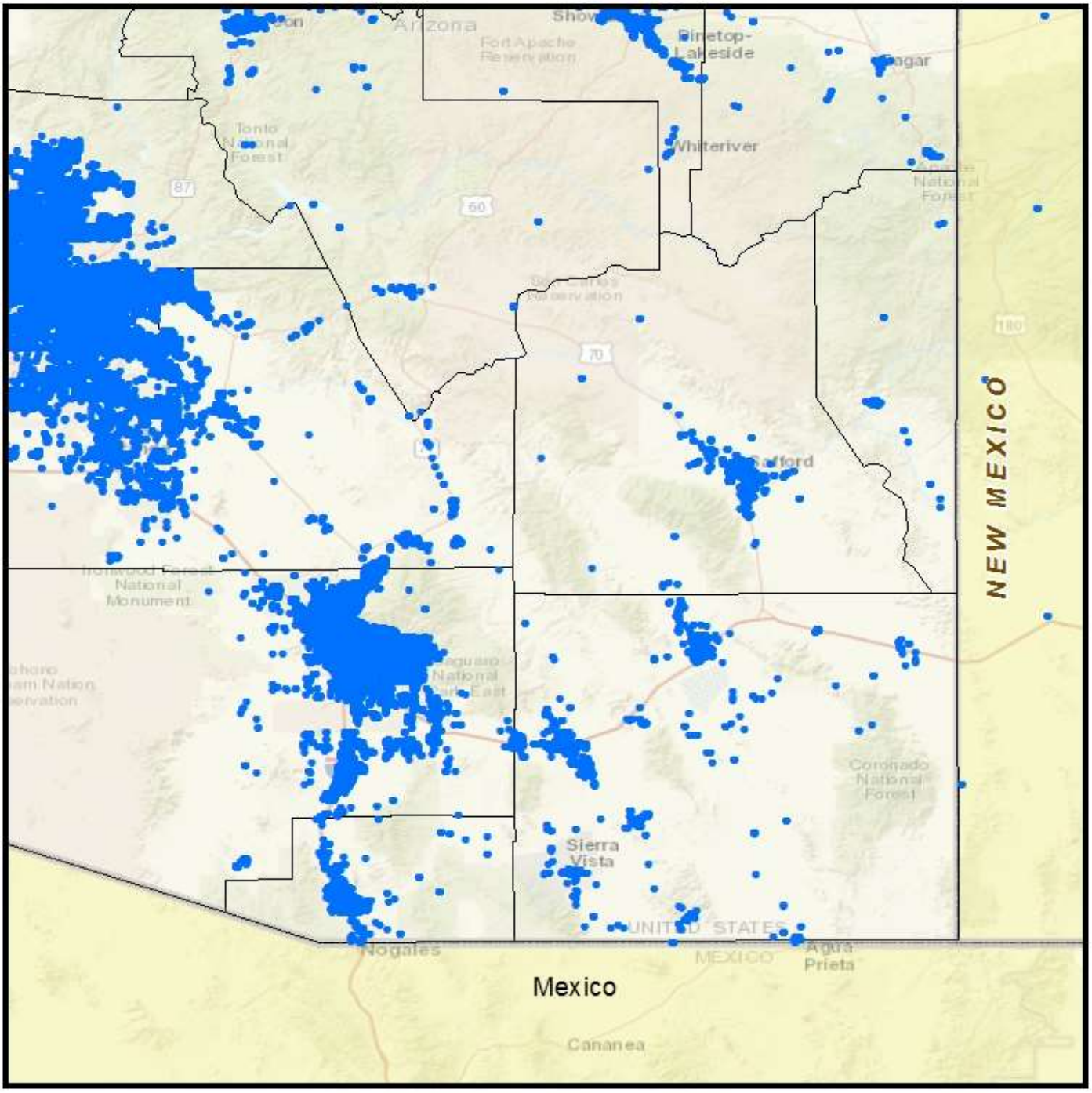


Figure 5: All Data Elements – Southeast Arizona

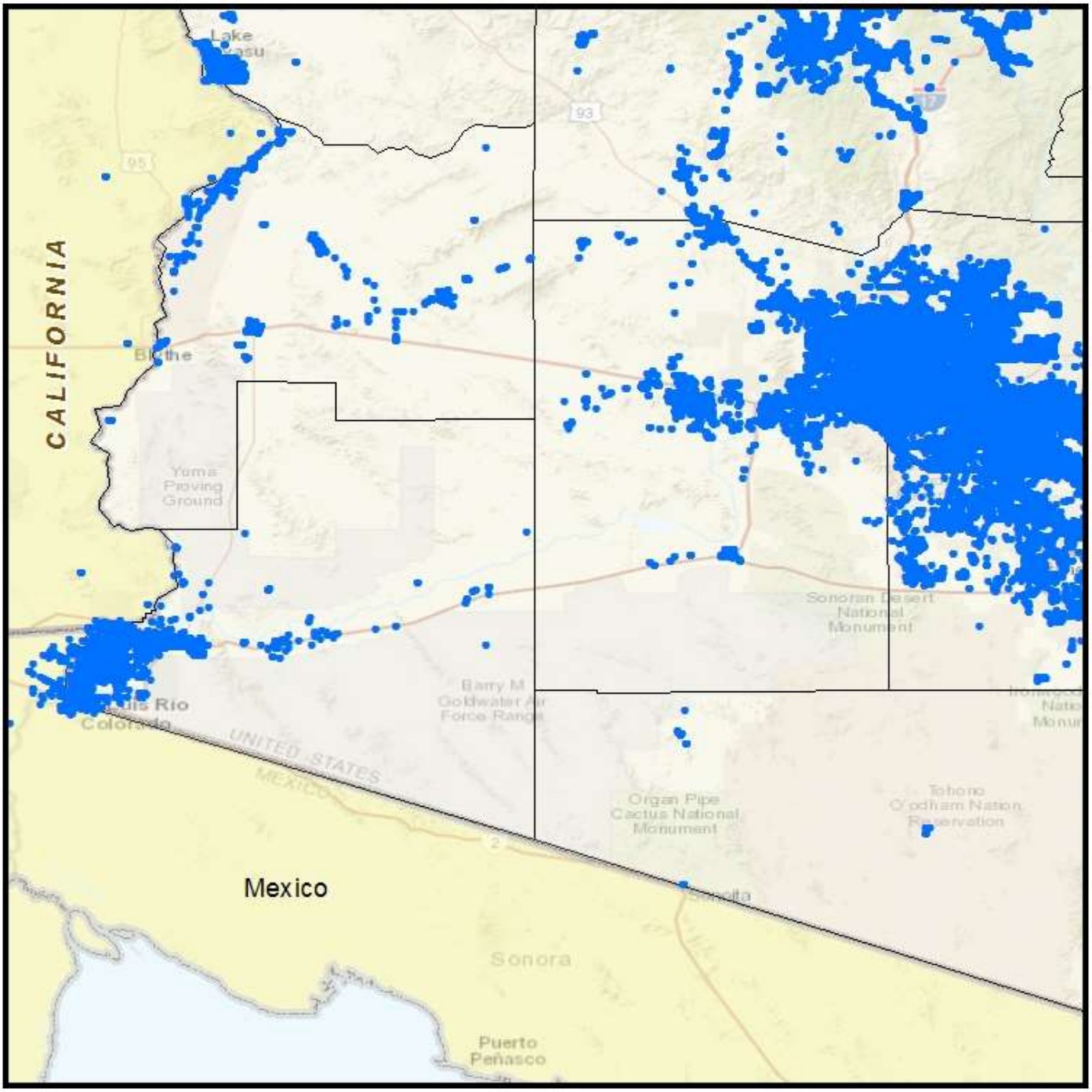


Figure 6: All Data Elements – Southwest Arizona

Figures 7 – 11 below depict just the CFS location data collected.

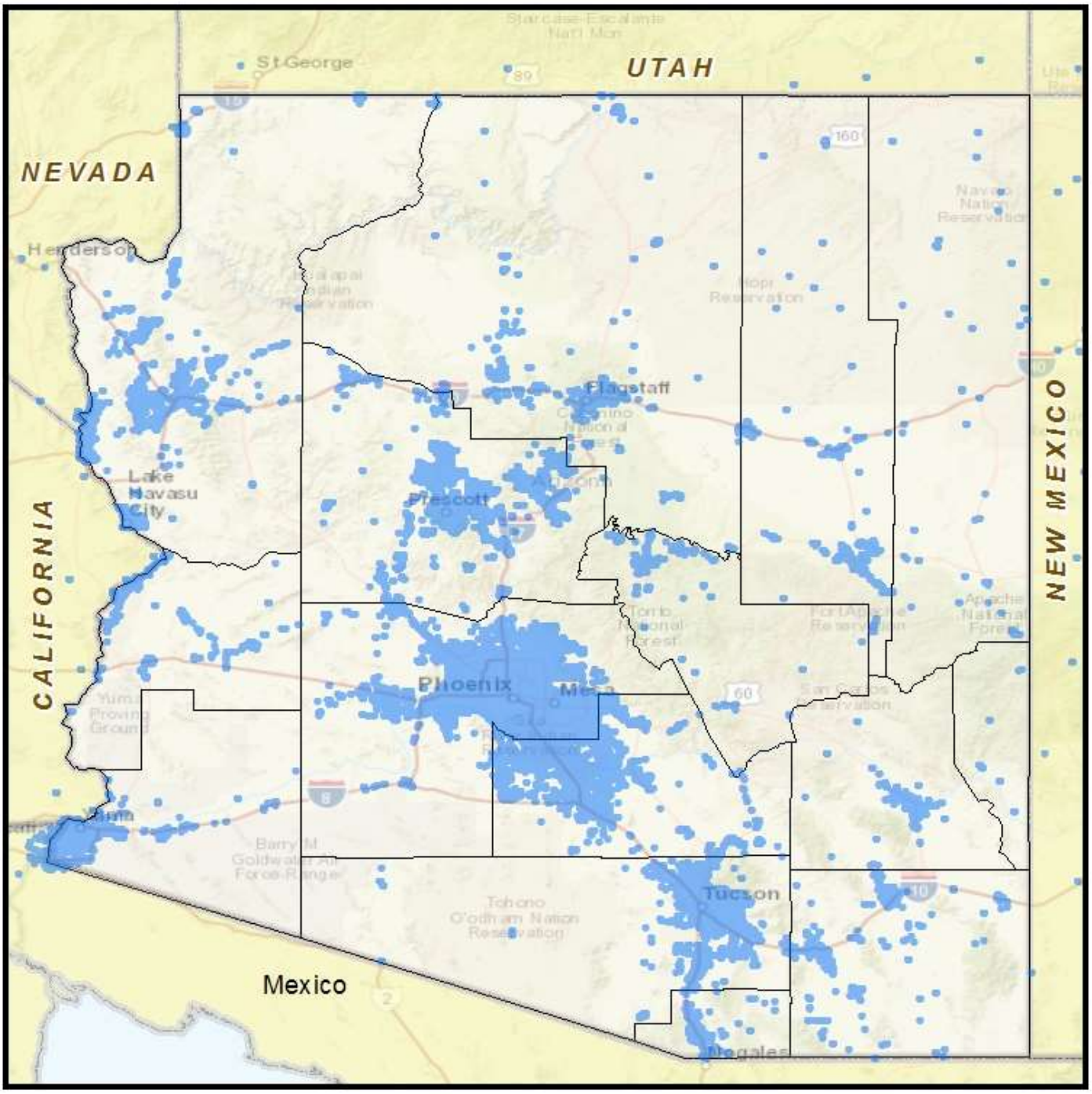


Figure 7: Calls for Service – Statewide

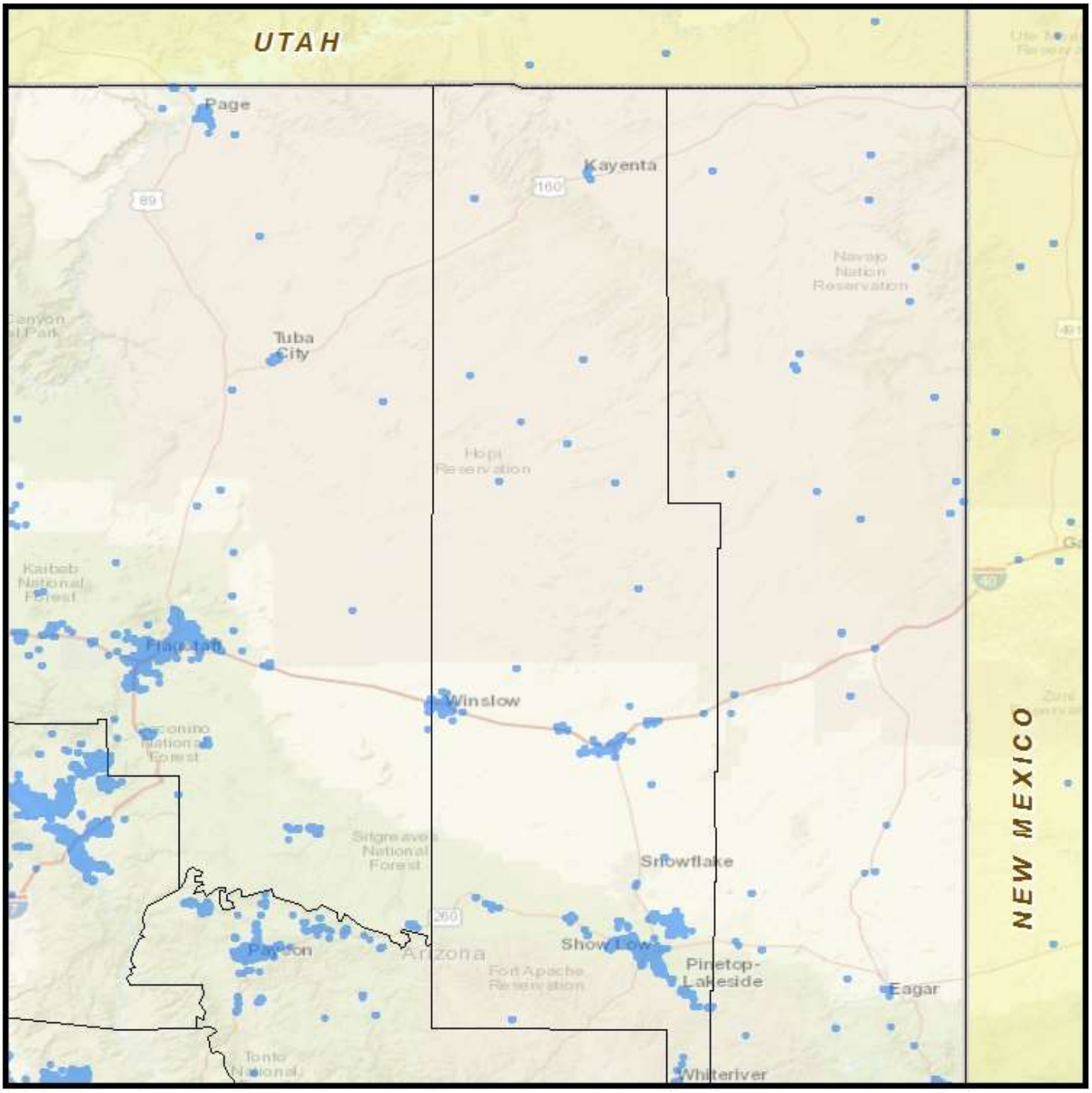


Figure 8: Calls for Service – Northeast Arizona

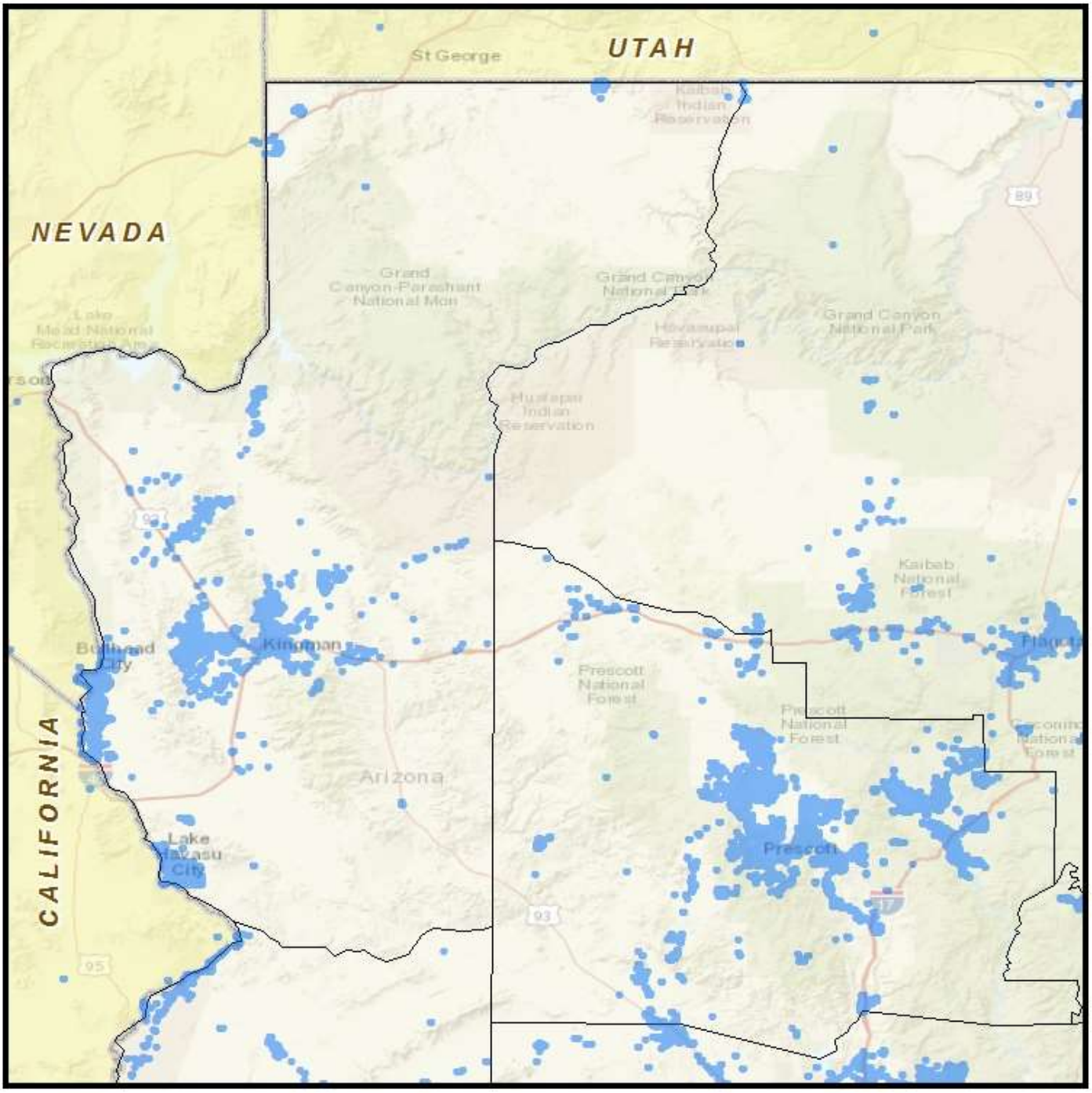


Figure 9: Calls for Service – Northwest Arizona

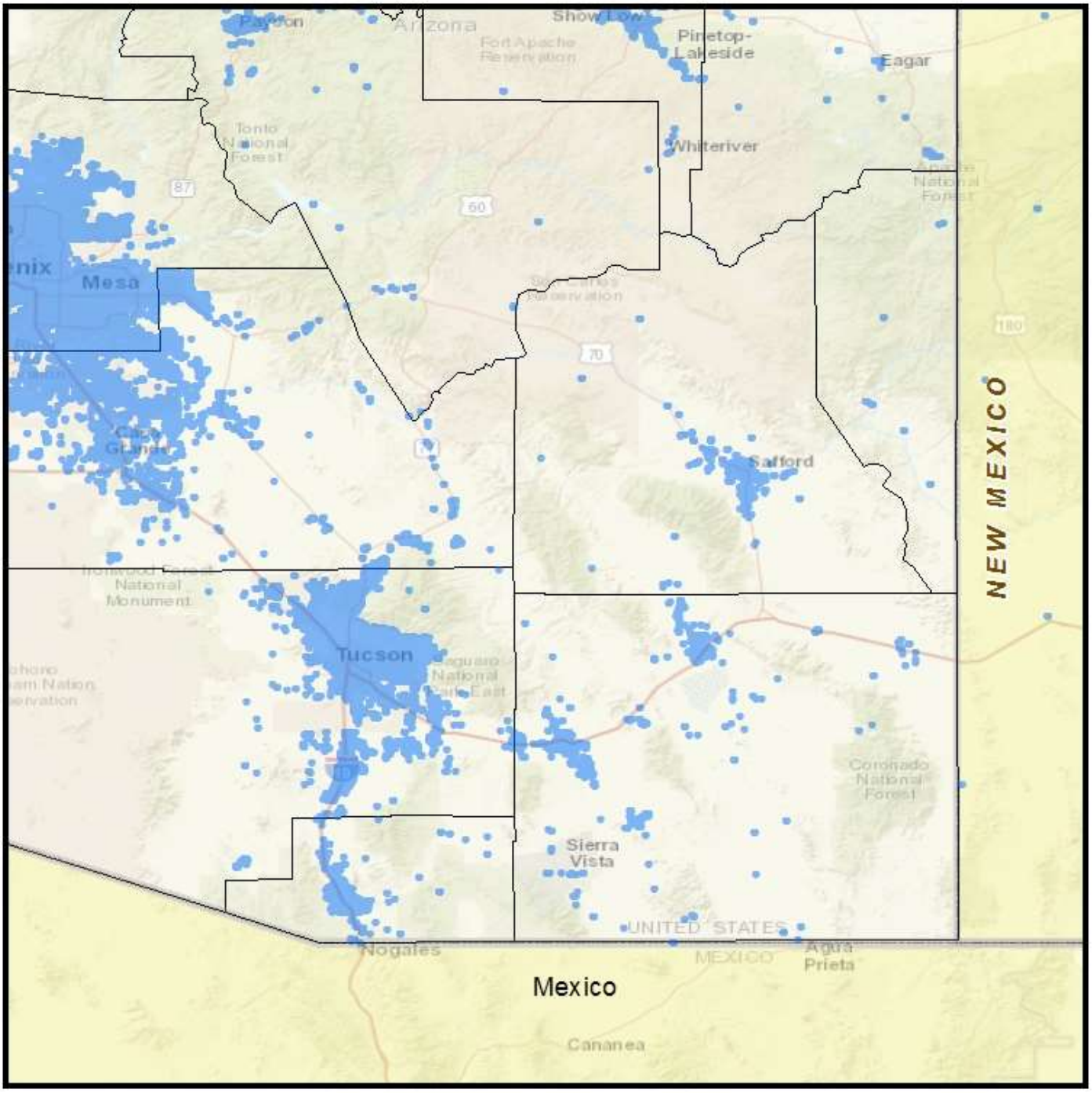


Figure 10: Calls for Service – Southeast Arizona

Figure 11: Calls for Service – Southwest Arizona

Figures 12 – 16 below represent the CIKR data collected.

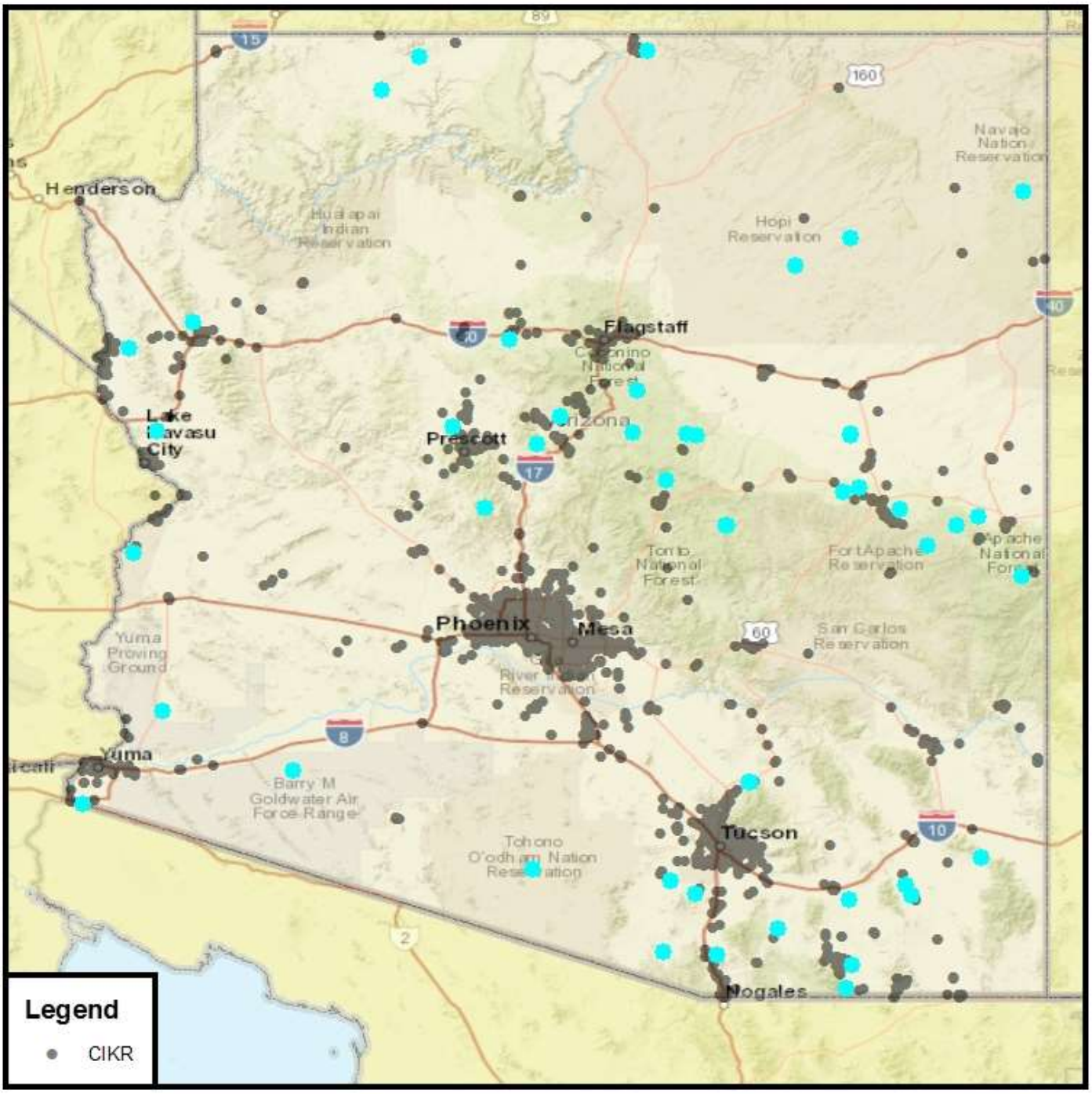


Figure 12: CIKR – Statewide

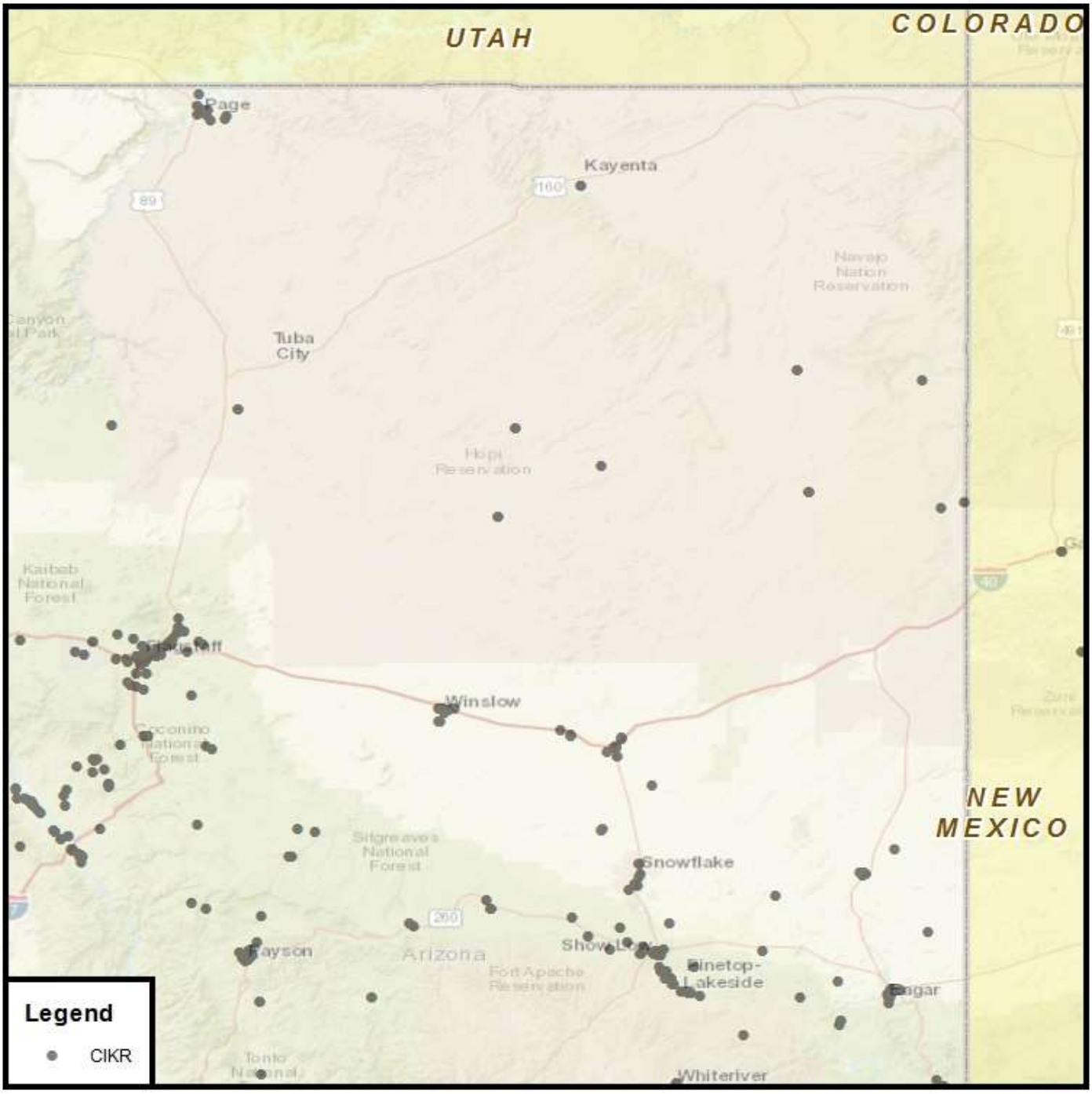


Figure 13: CIKR – Northeast Arizona

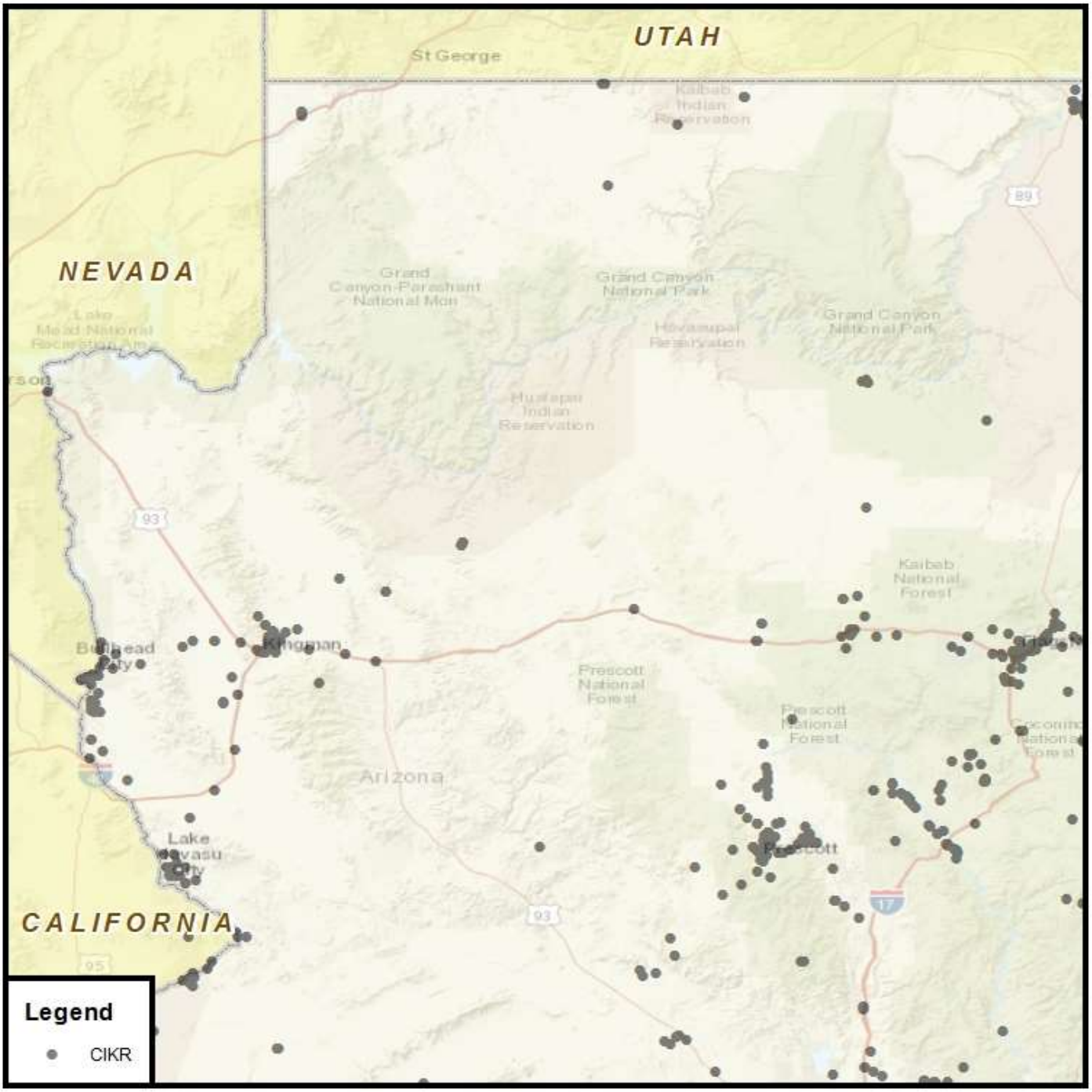


Figure 14: CIKR Northwest Arizona

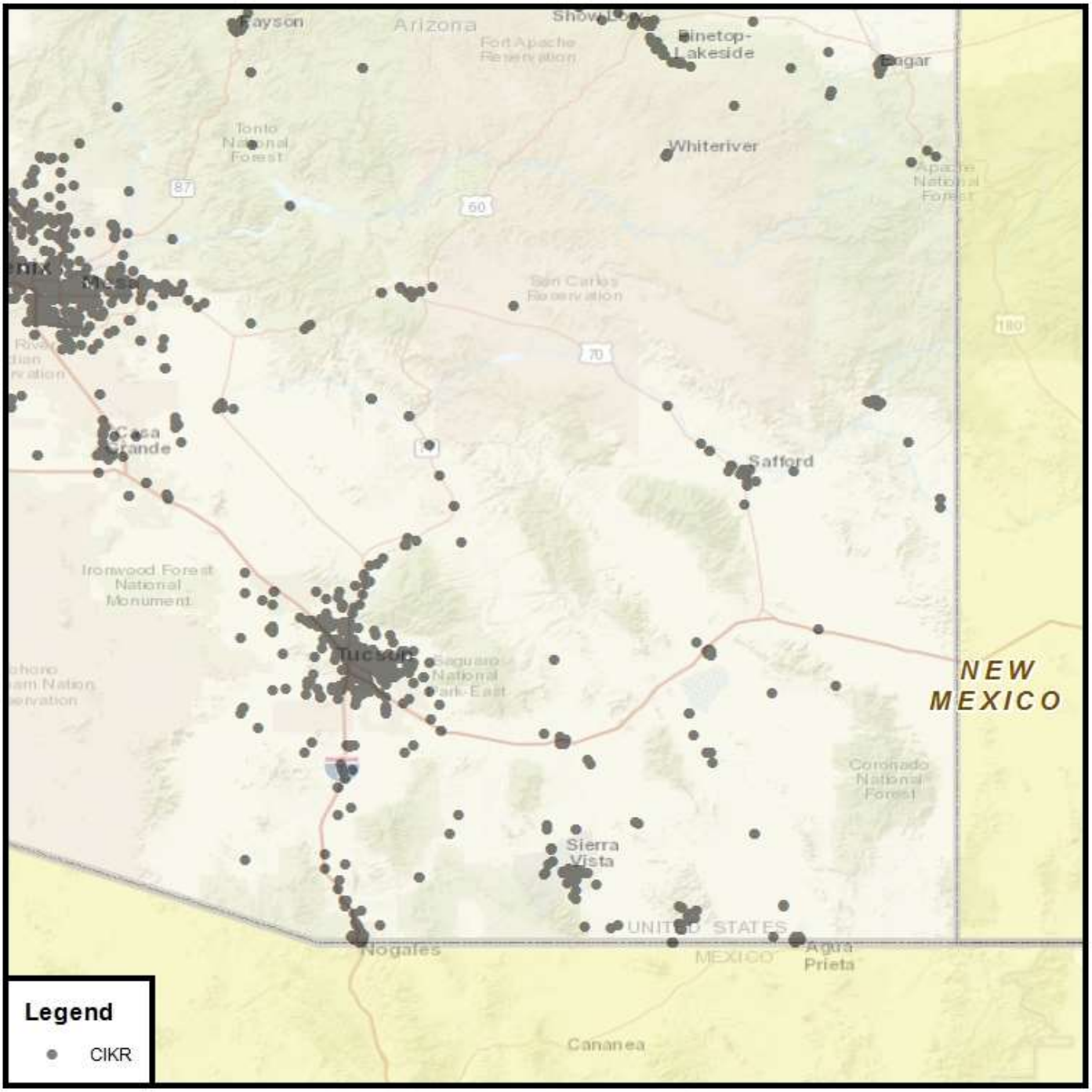


Figure 15: CIKR – Southeast Arizona

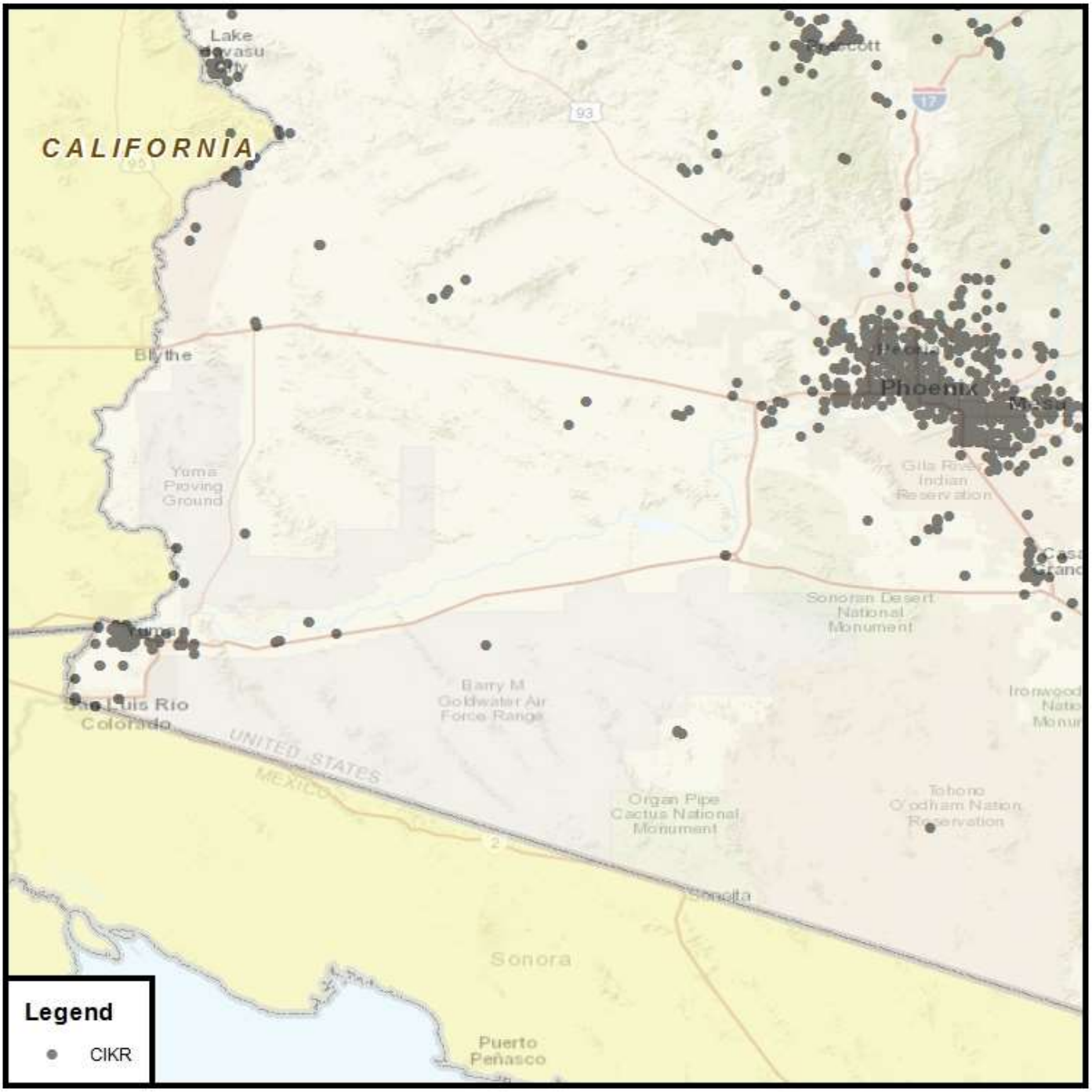


Figure 16: CIKR – Southwest Arizona

Figures 17 – 21 below depict one-square-mile grids that contain either CIKR or CFS data but will not receive coverage under FirstNet's baseline coverage plan.

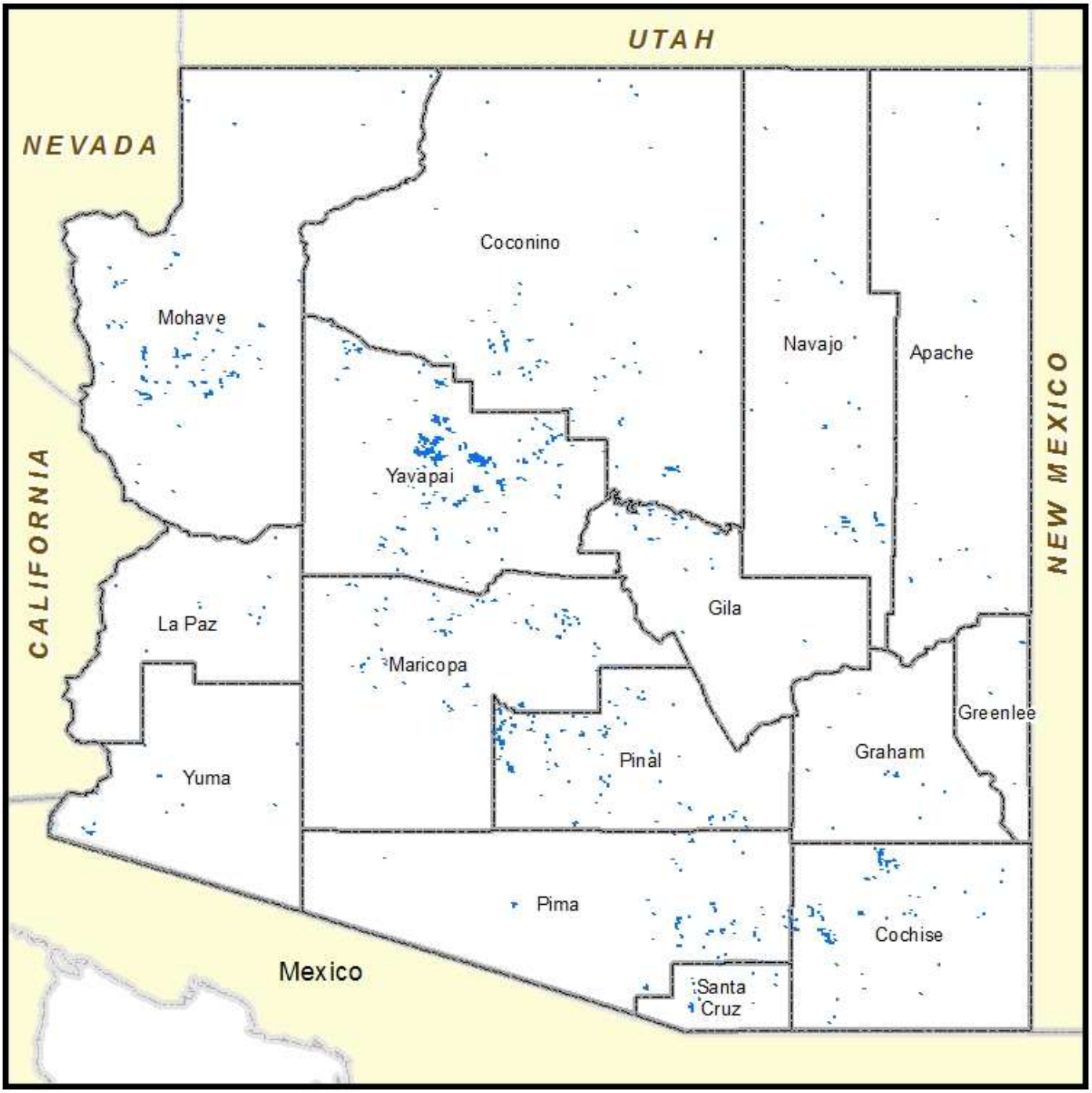


Figure 17: CIKR and CFS Grids in FirstNet Non-Coverage Areas – Statewide

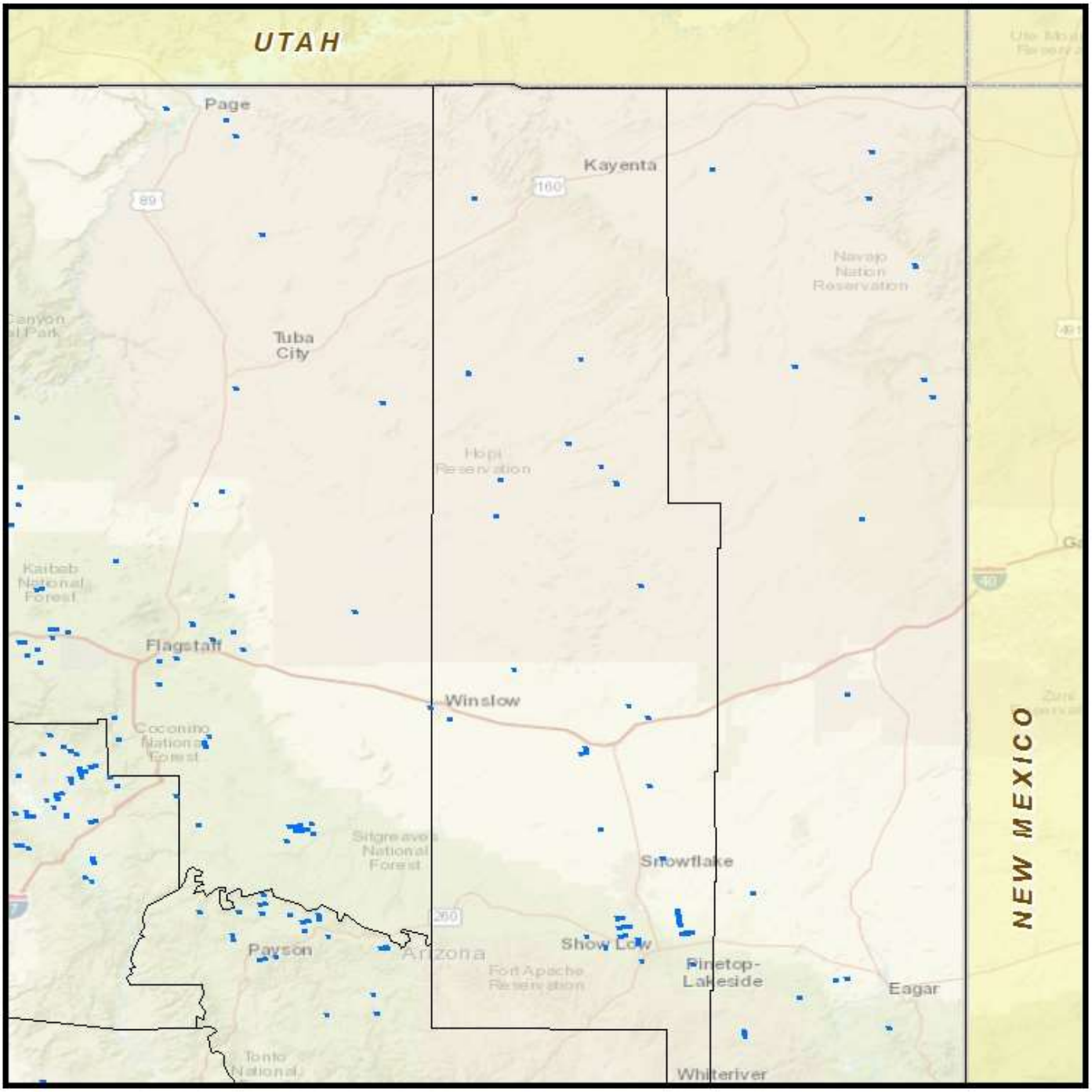


Figure 18: CIKR and CFS Grids in FirstNet Non-Coverage Areas– Northeast Arizona

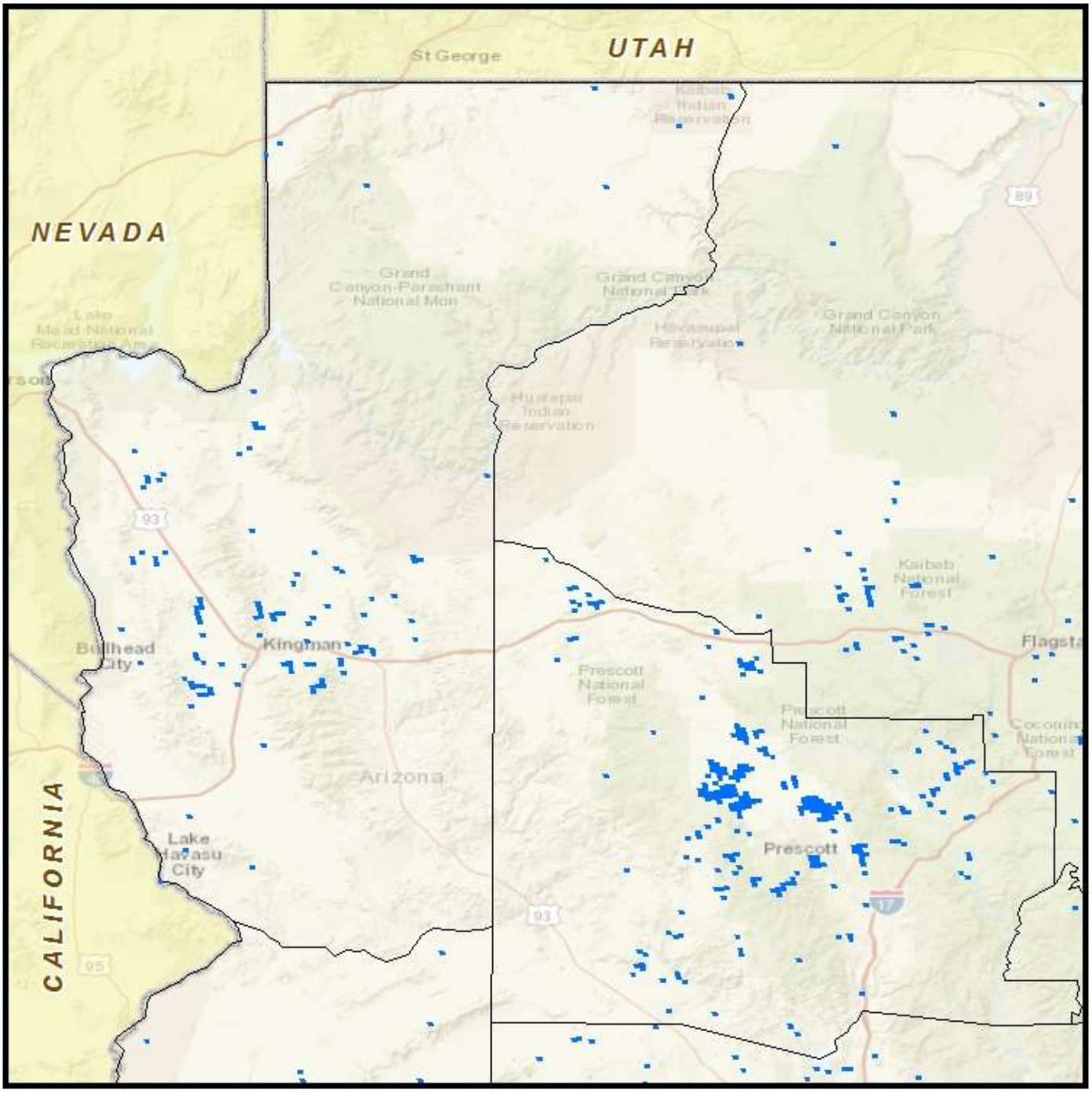


Figure 19: CIKR and CFS Grids in FirstNet Non-Coverage Areas – Northwest Arizona

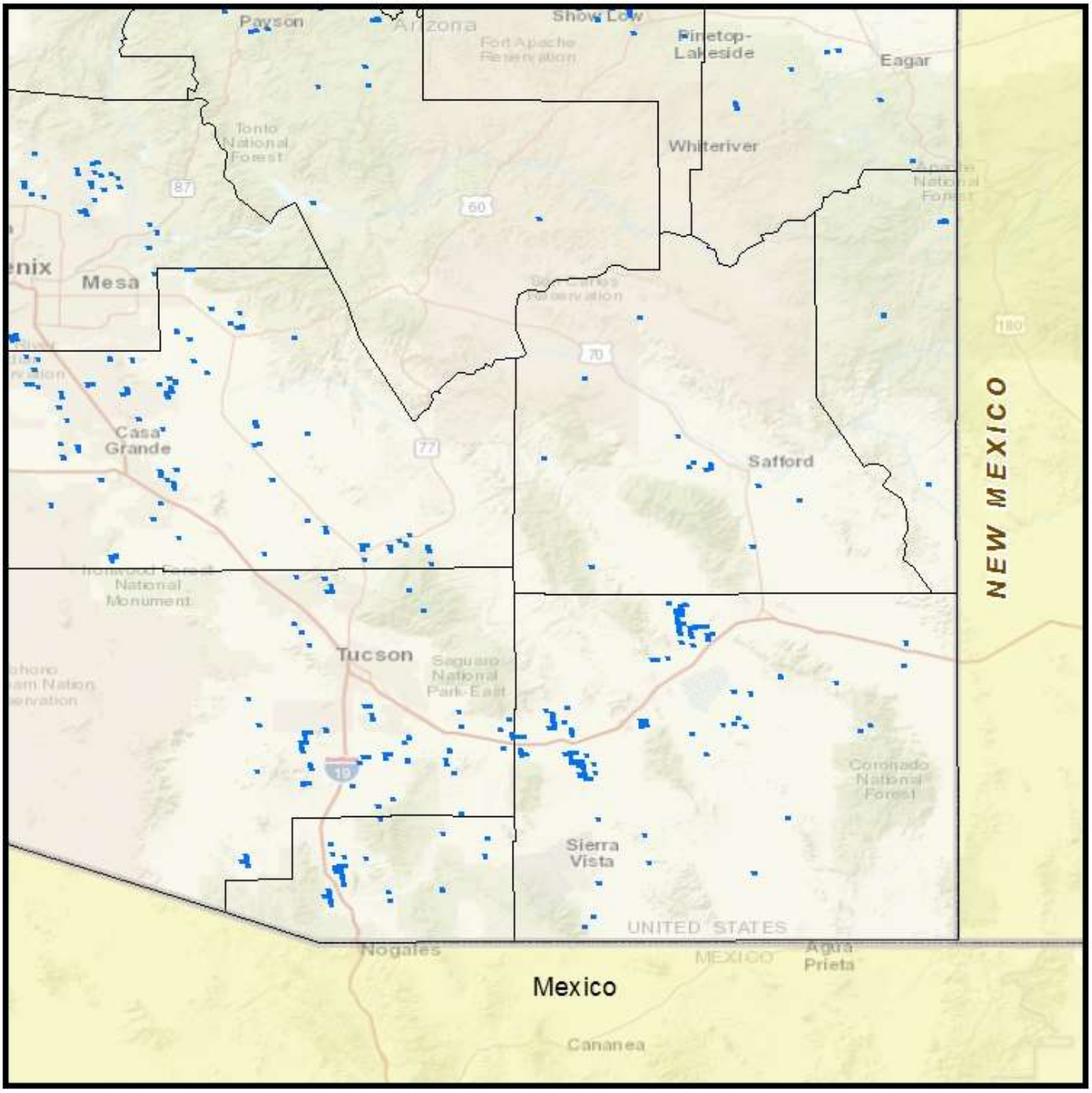


Figure 20: CIKR and CFS Grids in FirstNet Non-Coverage Areas – Southeast Arizona

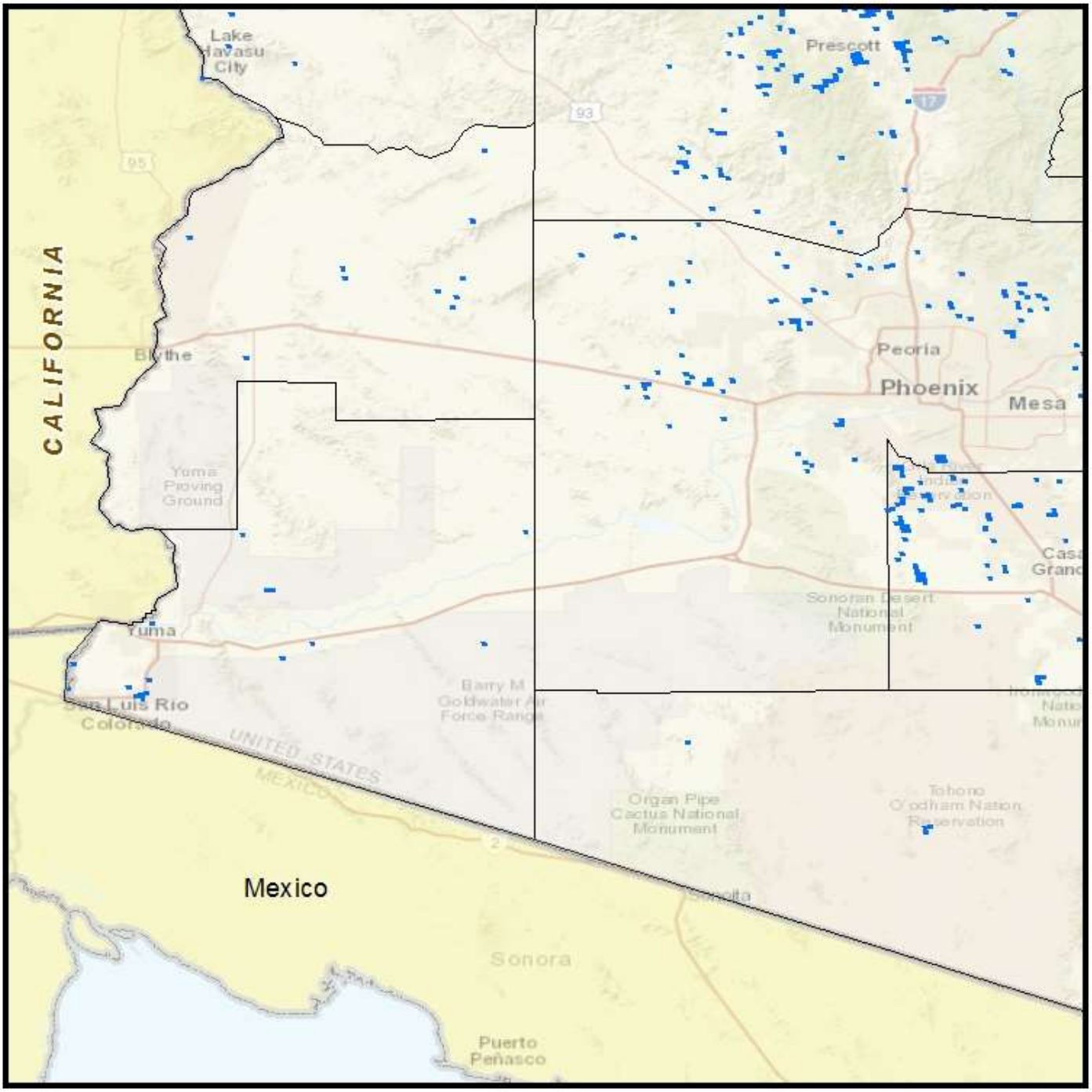


Figure 21: CIKR and CFS Grids in FirstNet Non-Coverage Areas – Southwest Arizona

Figures 22 – 26 below depict the CFS locations that would be situated outside of FirstNet's anticipated coverage.

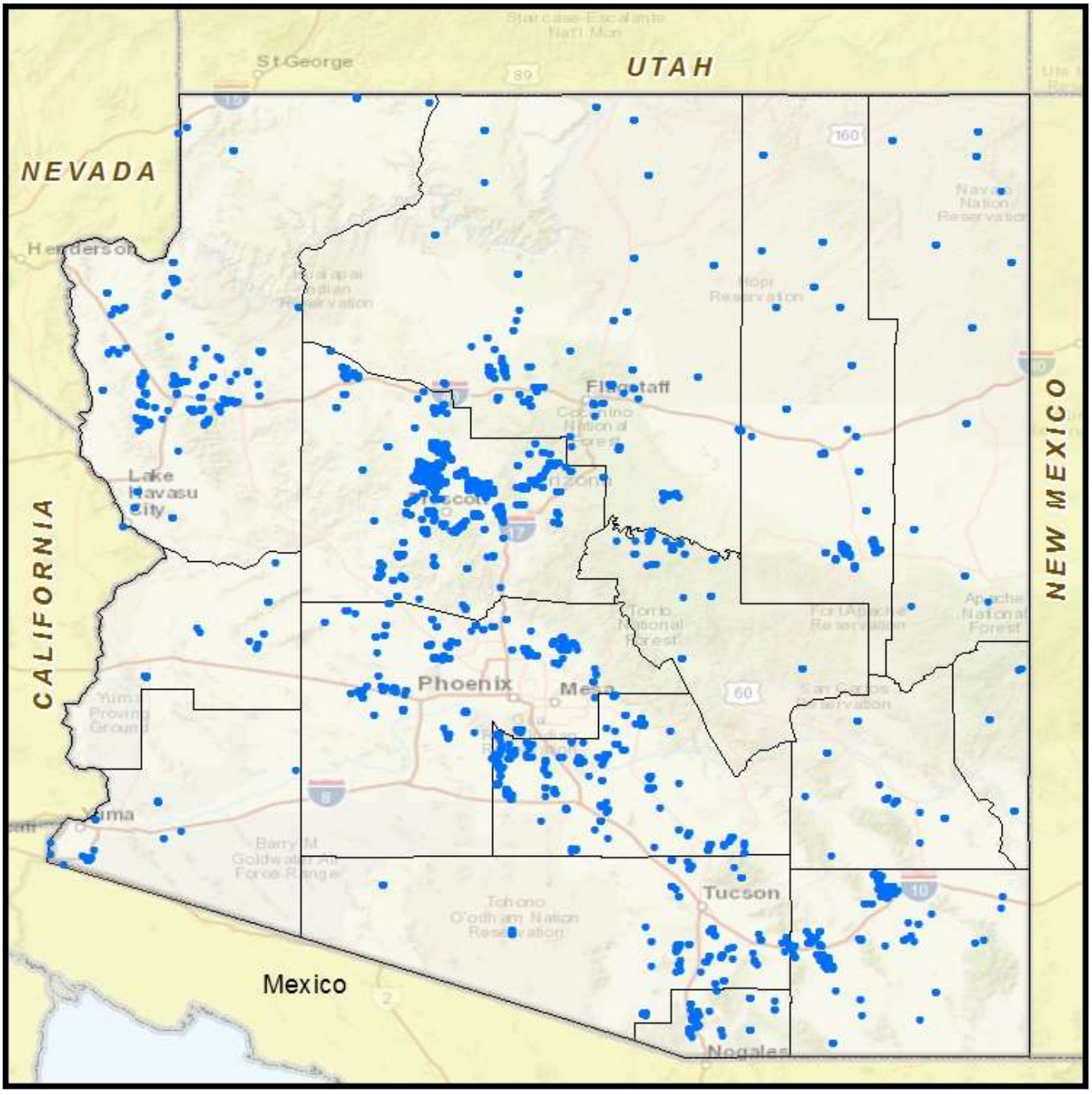


Figure 22: CFS Locations Outside of FirstNet Coverage – Statewide

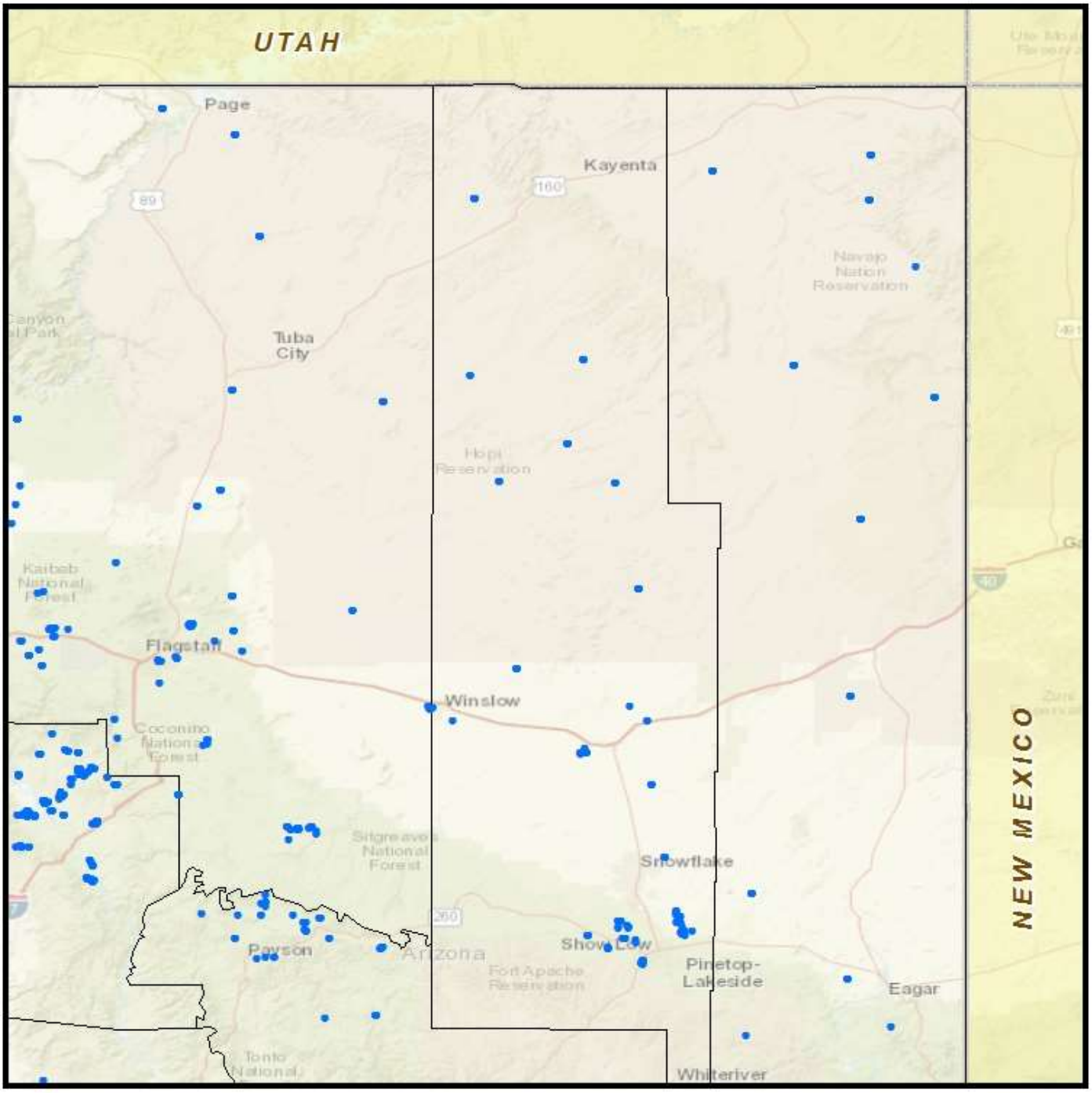


Figure 23: CFS Locations Outside of FirstNet Coverage – Northeast Arizona

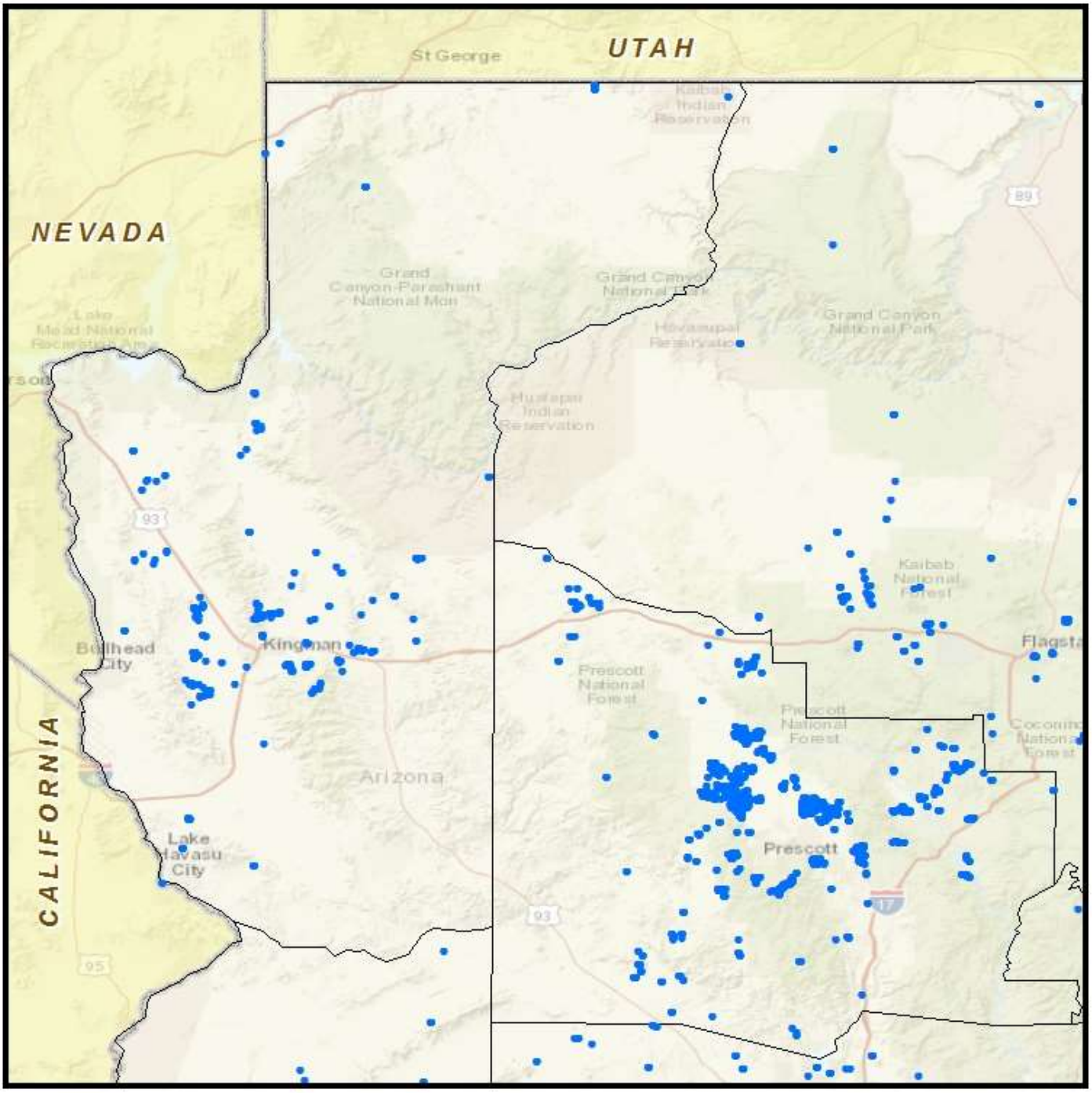


Figure 24: CFS Locations Outside of FirstNet Coverage – Northwest Arizona

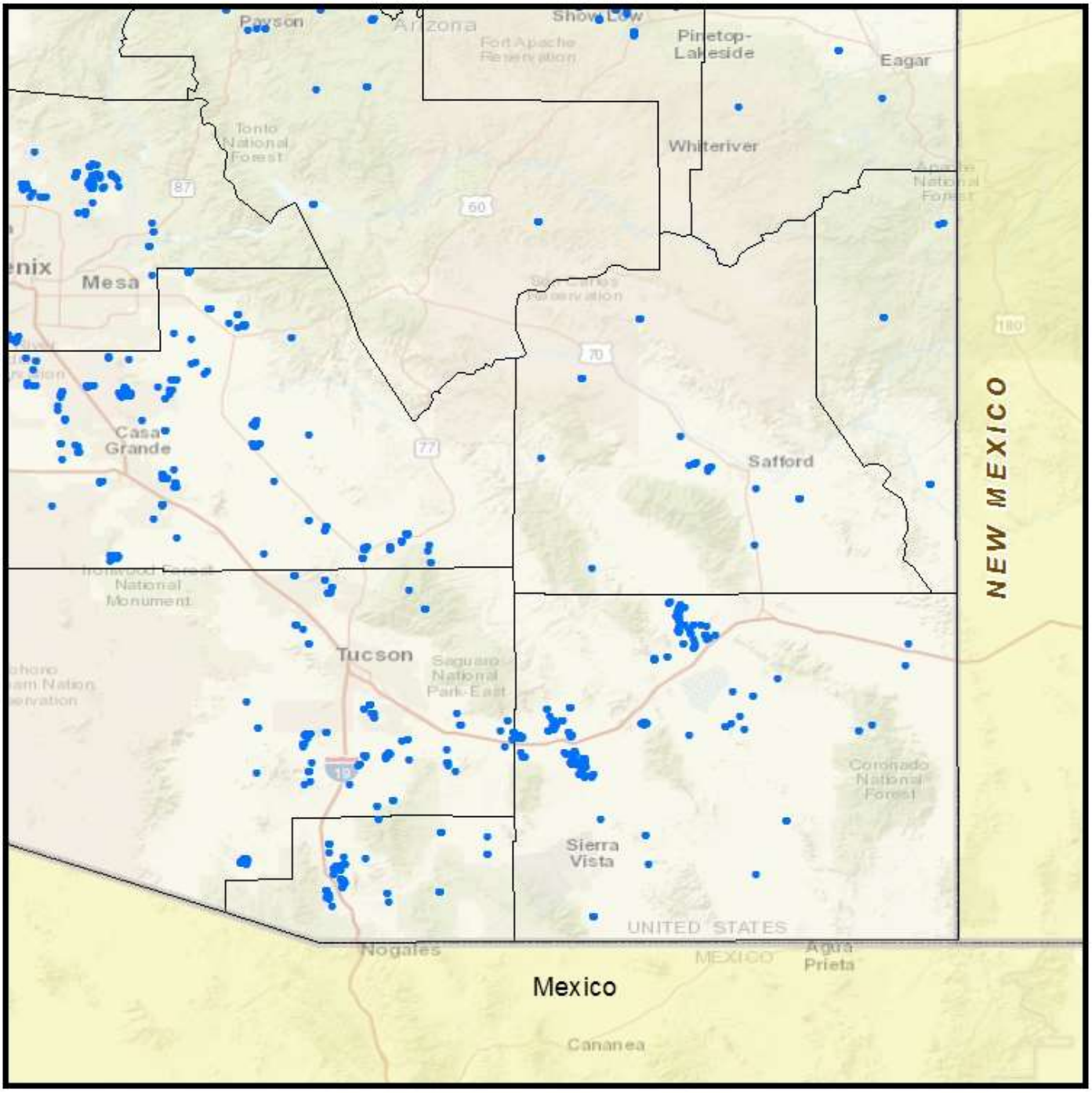


Figure 25: CFS Locations Outside of FirstNet Coverage – Southeast Arizona

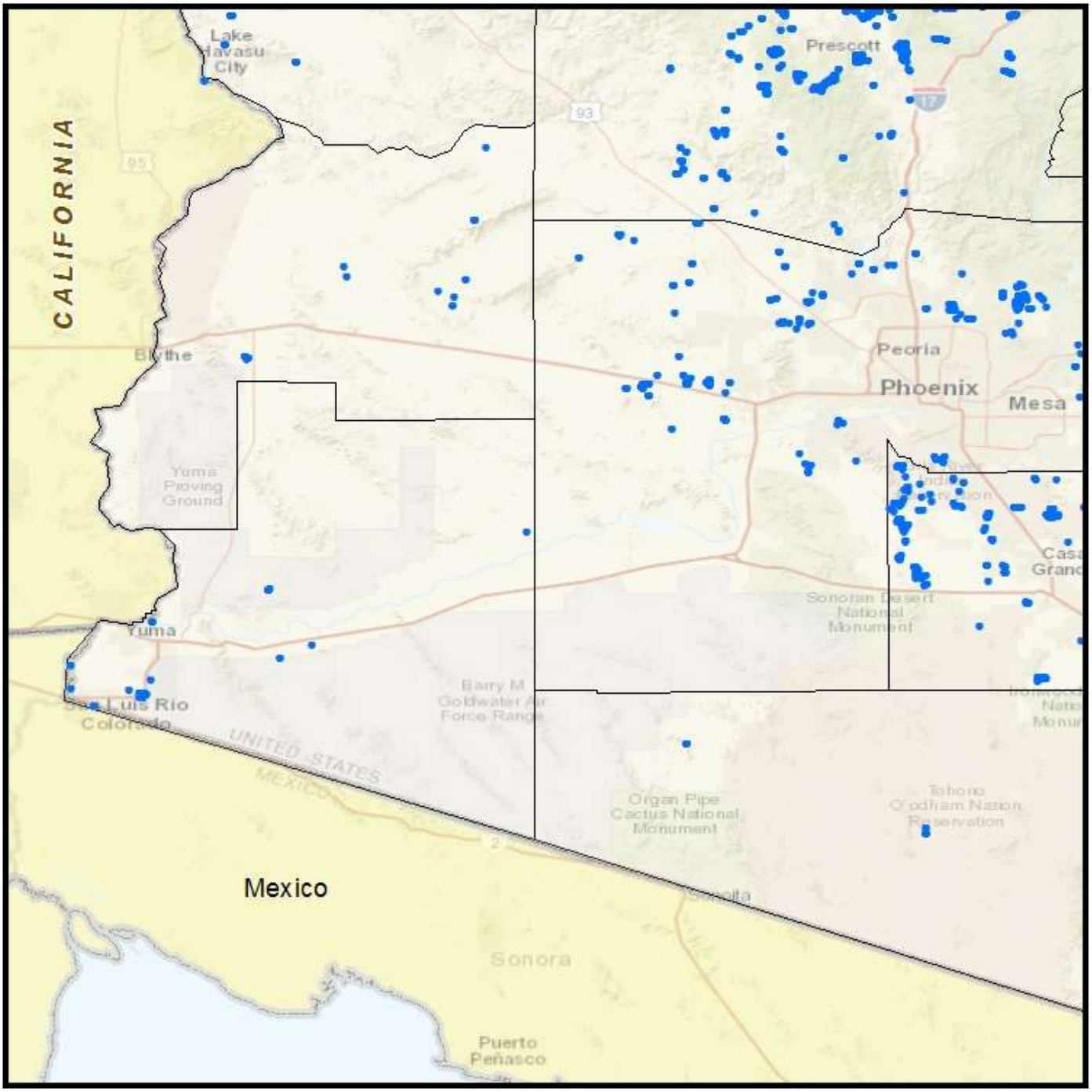


Figure 26: CFS Locations Outside of FirstNet Coverage – Southwest Arizona

Figures 27 – 31 below represent CIKR elements that are situated outside of FirstNet's anticipated coverage.

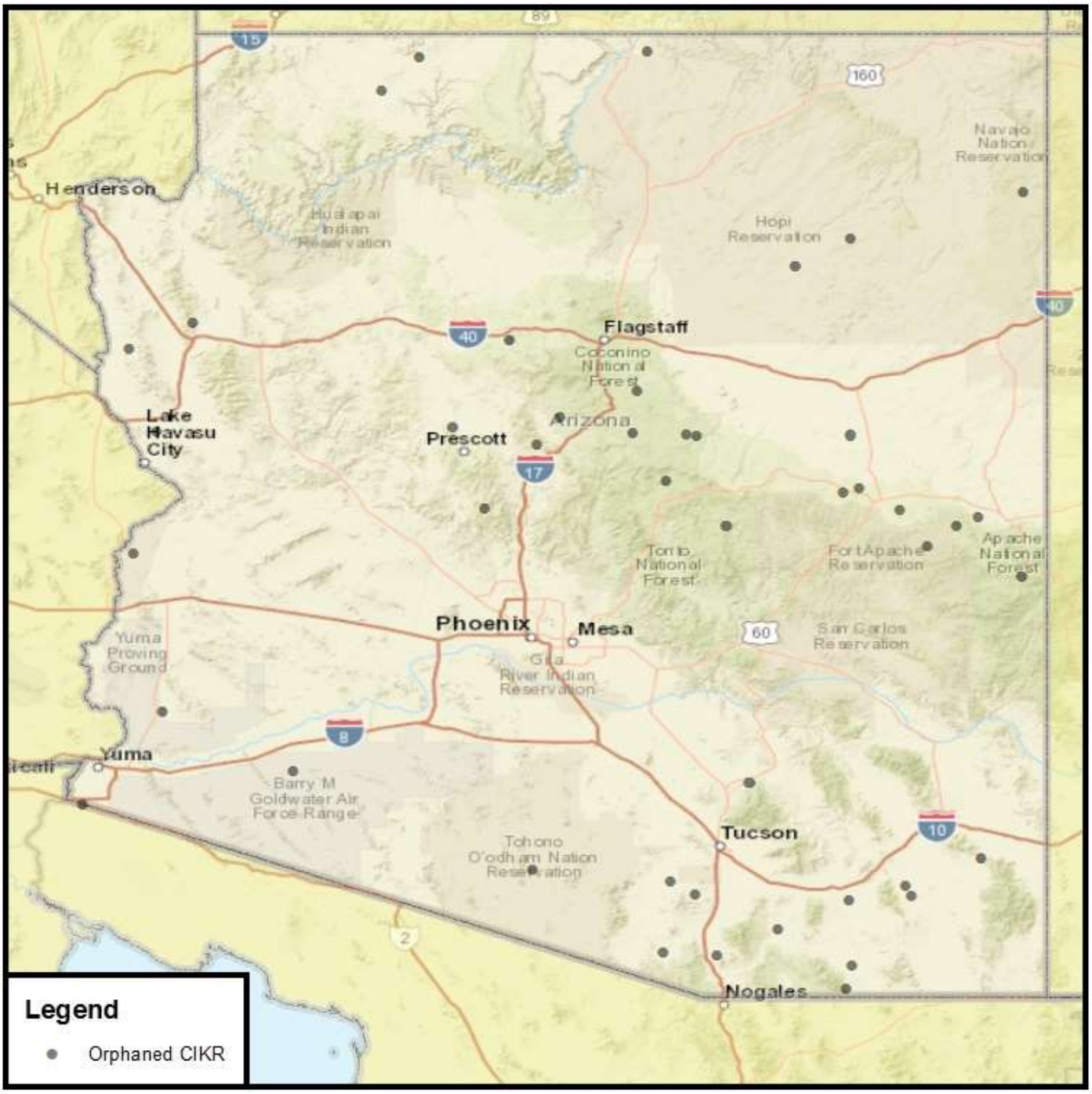


Figure 27: CIKR Locations Outside of FirstNet Coverage – Statewide

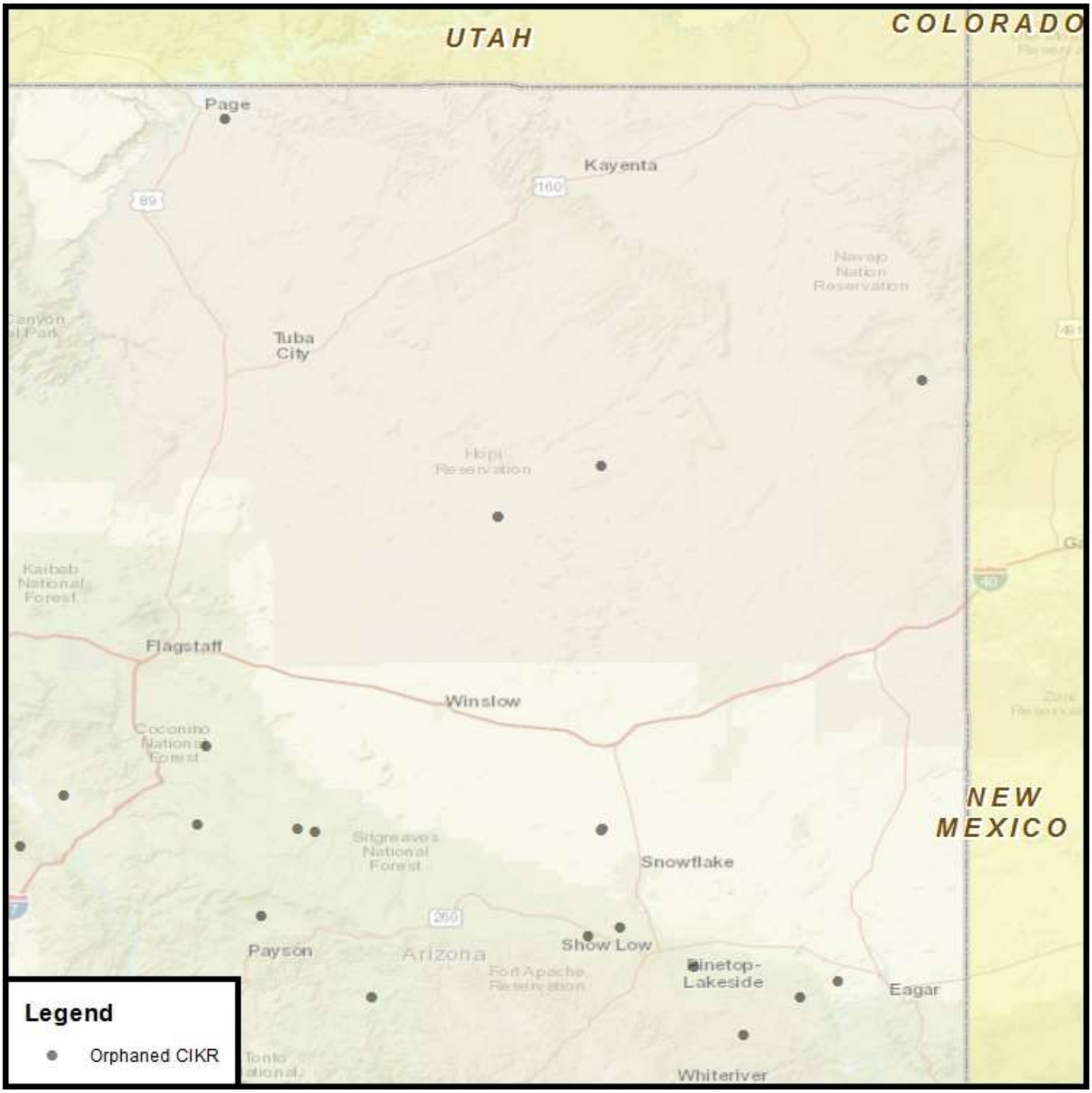


Figure 28: CIKR Locations Outside of FirstNet Coverage – Northeast Arizona

Figure 29: CIKR Locations Outside of FirstNet Coverage – Northwest Arizona

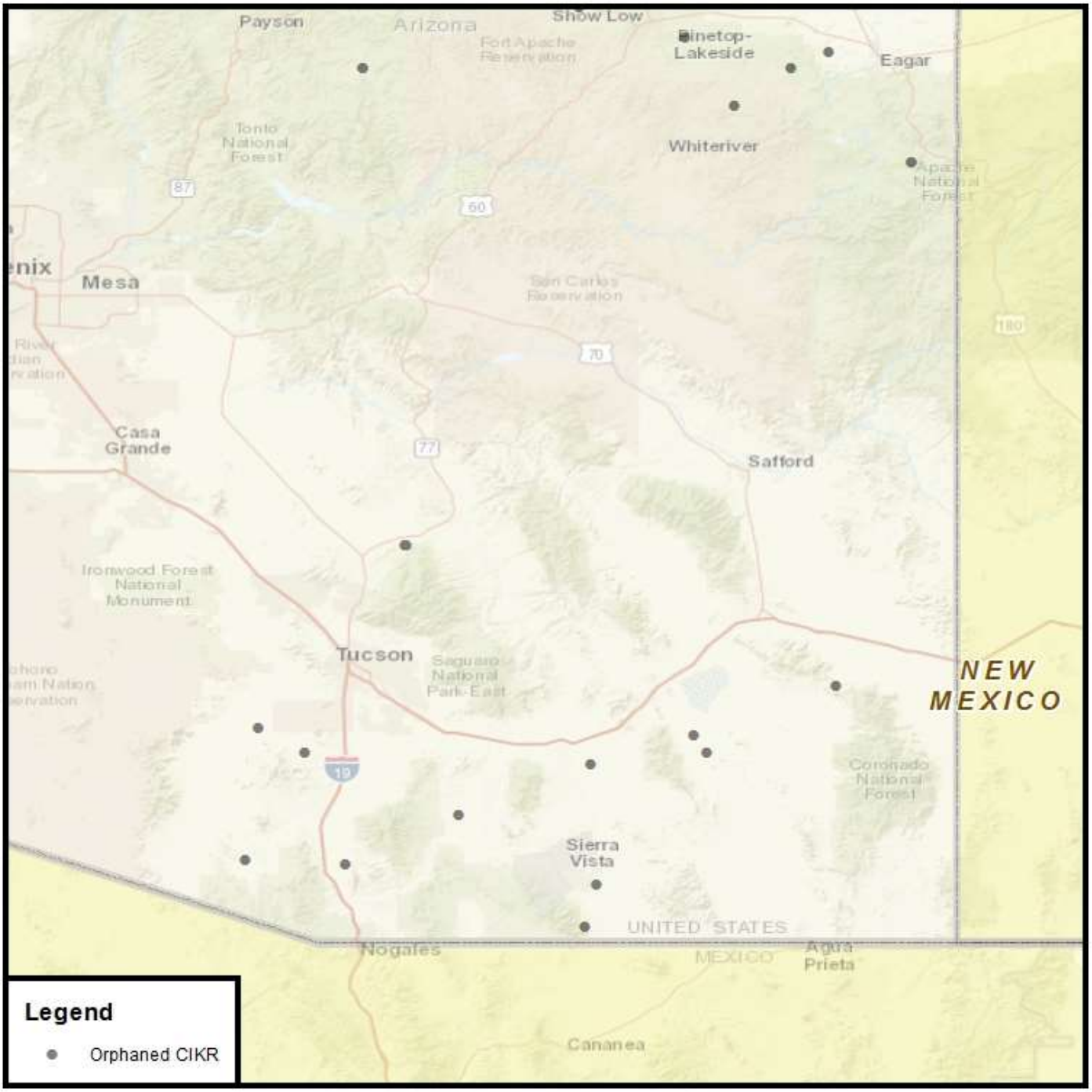


Figure 30: CIKR Locations Outside of FirstNet Coverage – Southeast Arizona

Figure 31: CIKR Locations Outside of FirstNet Coverage – Southwest Arizona

Figures 32 – 36 below depict the actual CIKR and CFS locations that would lie outside of FirstNet's anticipated coverage.

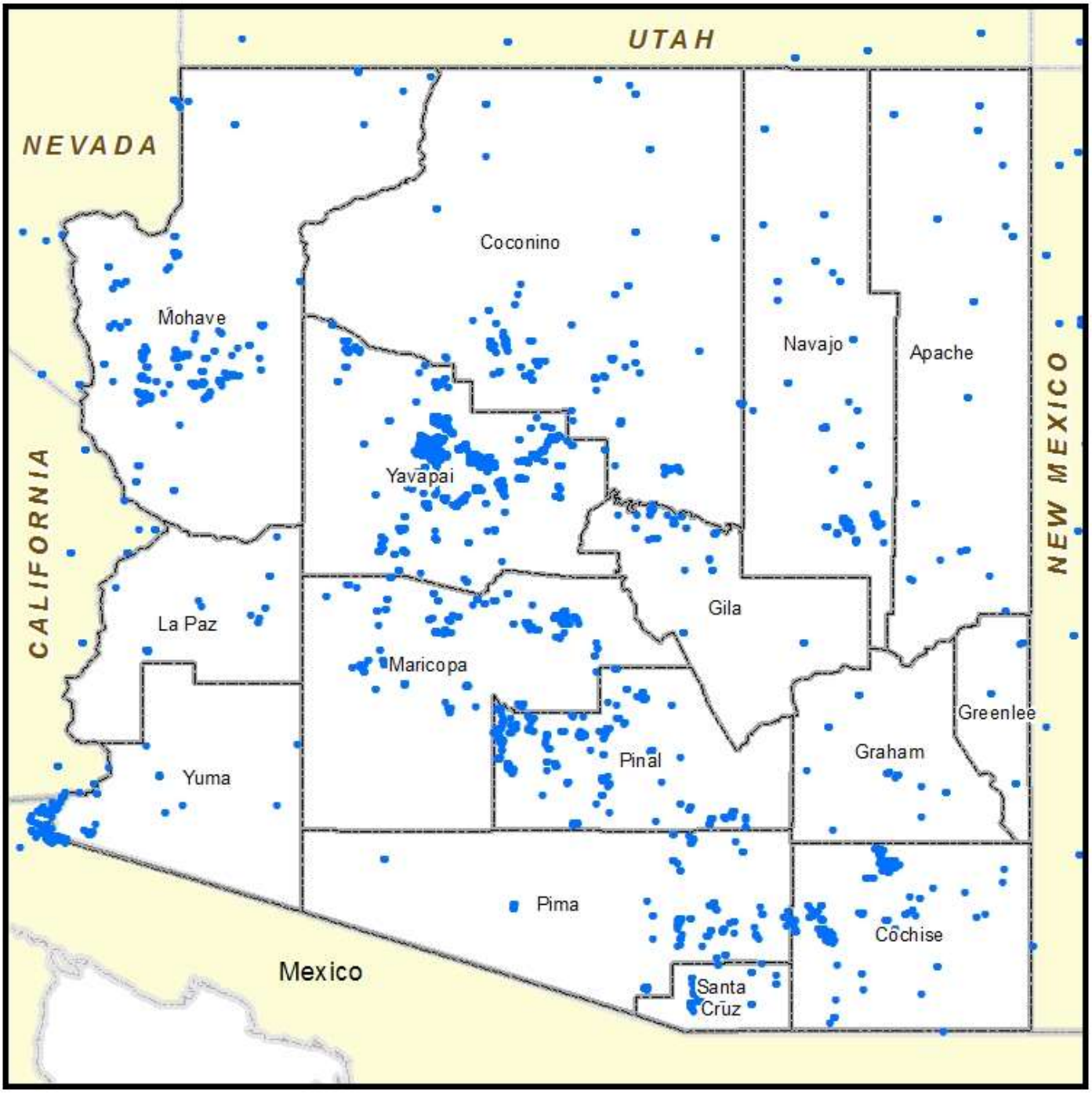


Figure 32: CFS and CIKR Locations Outside of FirstNet Coverage – Statewide

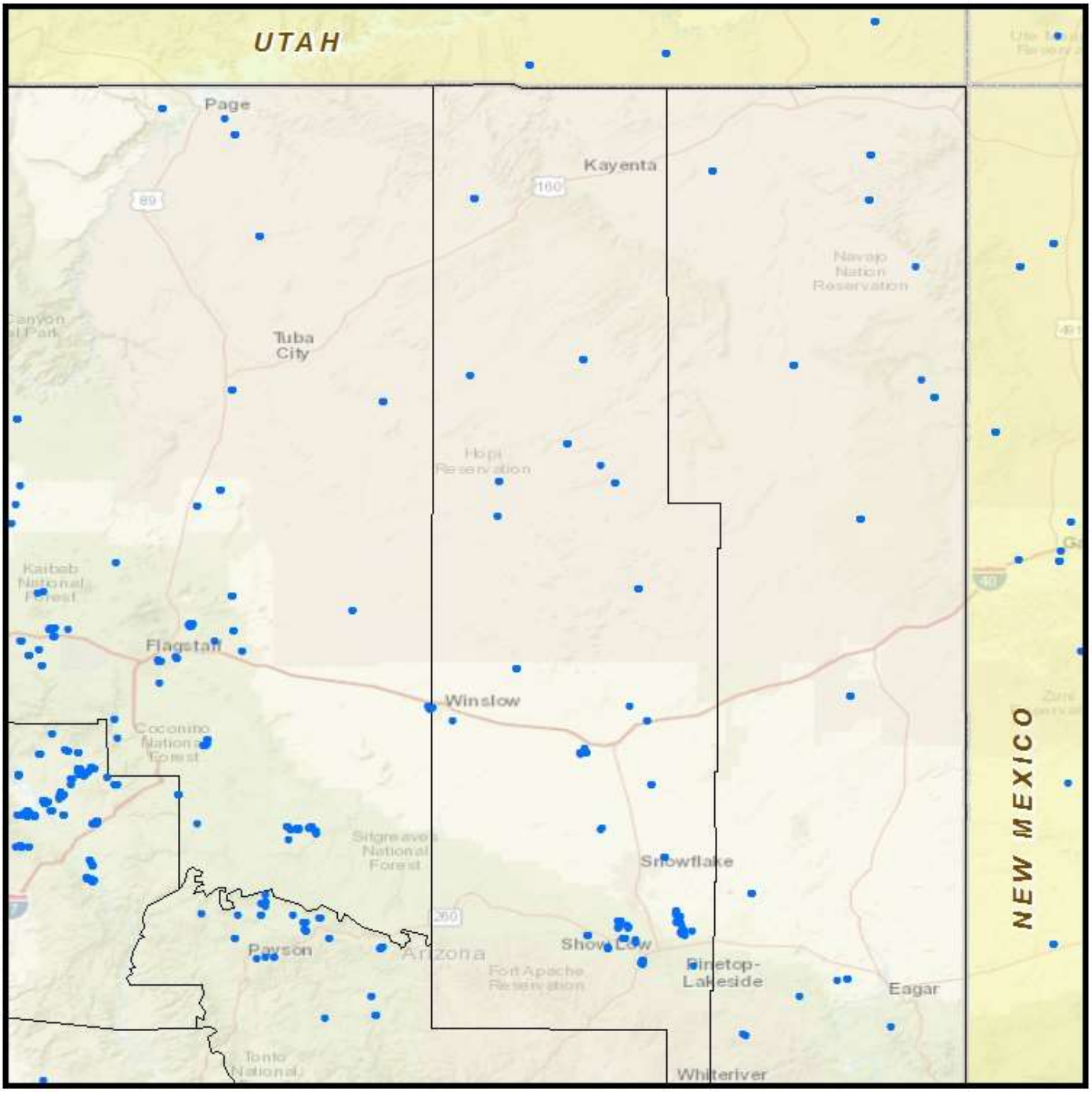


Figure 33: CFS and CIKR Locations Outside of FirstNet Coverage – Northeast Arizona

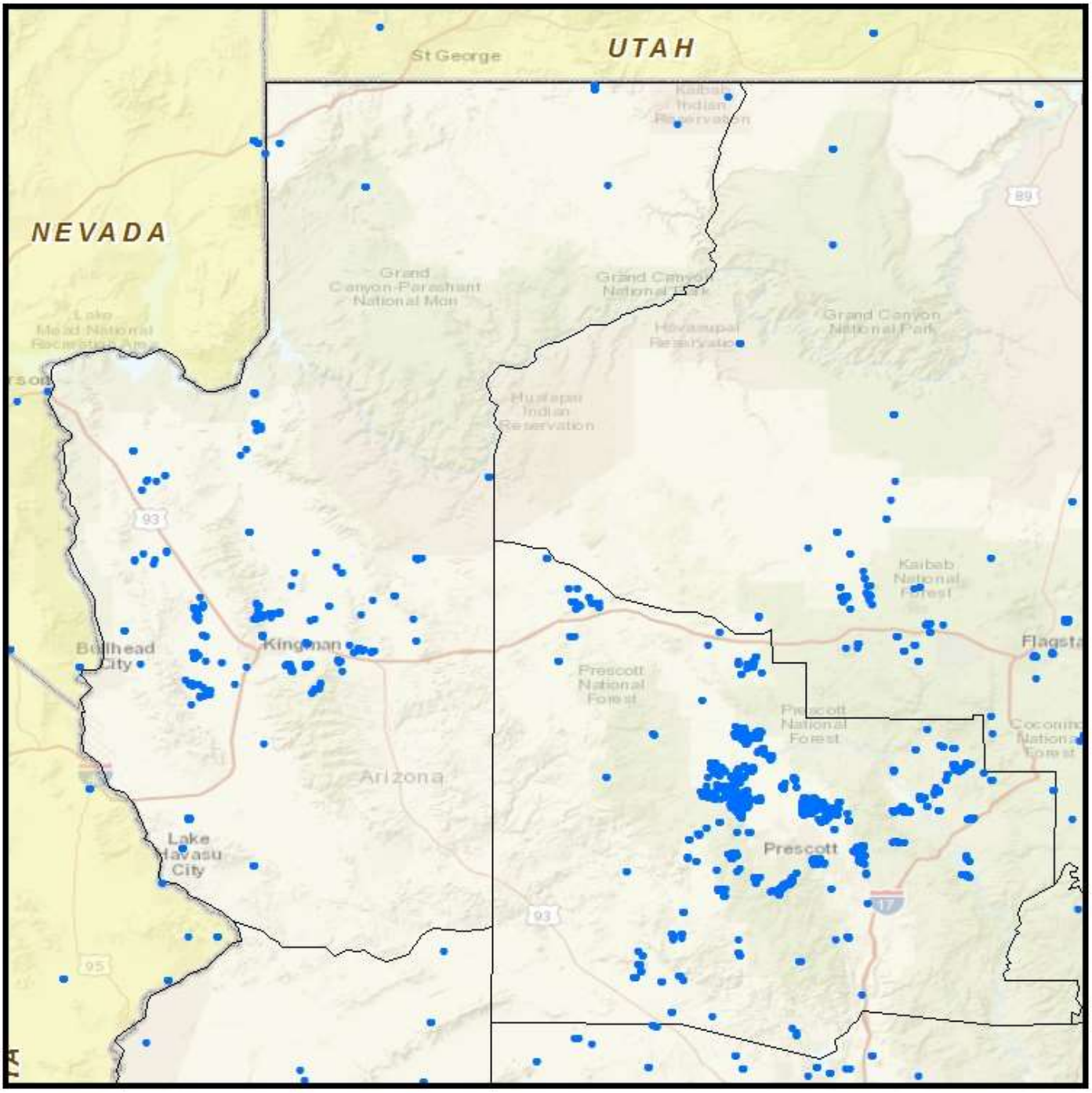


Figure 34: CFS and CIKR Locations Outside of FirstNet Coverage – Northwest Arizona

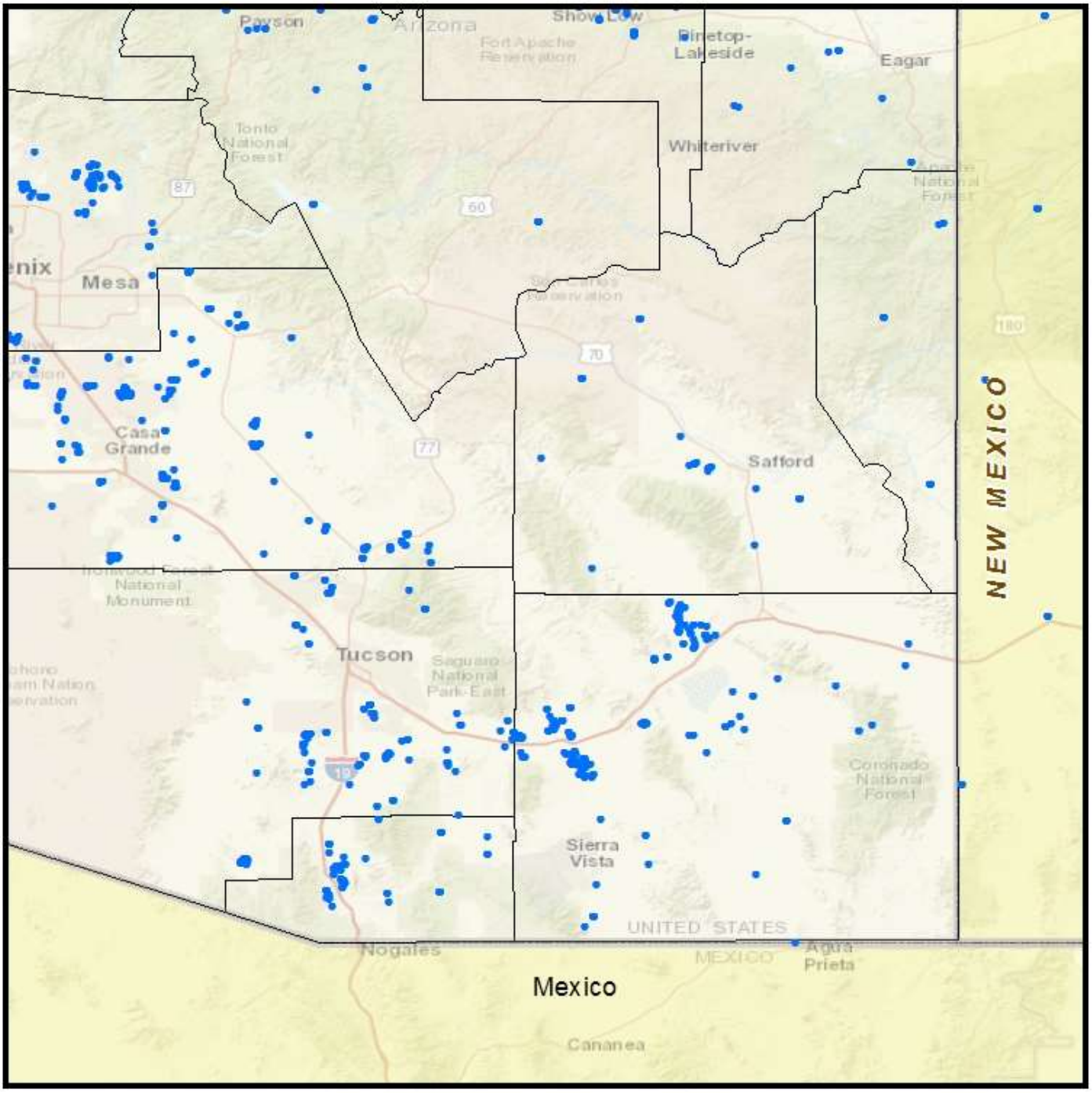


Figure 35: CFS and CIKR Locations Outside of FirstNet Coverage – Southeast Arizona

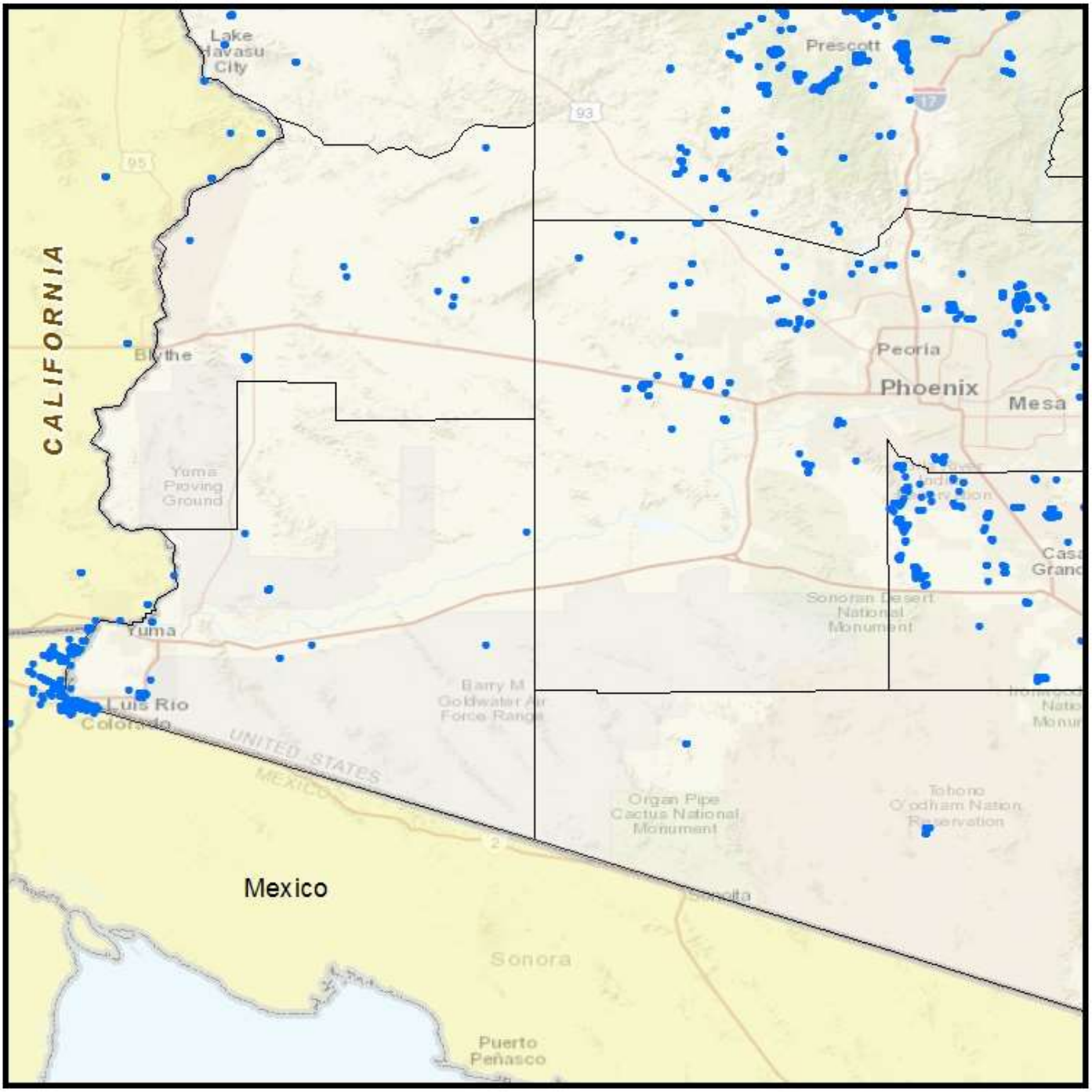


Figure 36: CFS and CIKR Locations Outside of FirstNet Coverage – Southwest Arizona

3.1.1. Locally Identified Areas

Survey respondents were asked to upload maps into the survey tool to indicate local areas that present a higher risk for public safety responses, and would therefore be in need of coverage. The following maps were received from responding agencies.

Figure 37 below was received from the Mesa Fire and Medical Department and depicts large coverage gaps in and around the urban/suburban Mesa area that should receive network coverage.

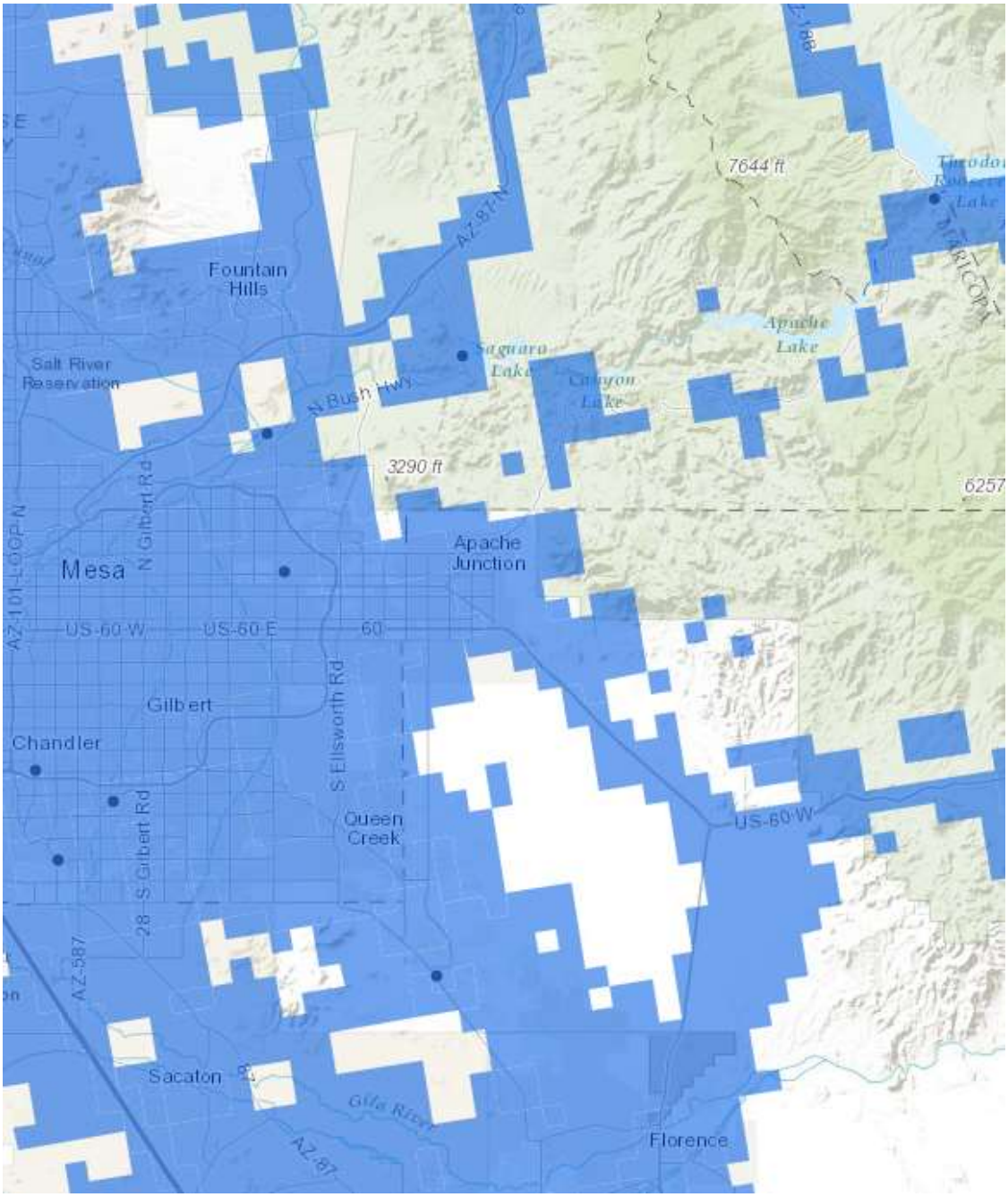


Figure 37: Mesa Fire and Medical Department Coverage Gaps

Figure 38 below was submitted by the Arizona Department of Emergency and Military Affairs (DEMA) and depicts the need for coverage along the southern border of Arizona.

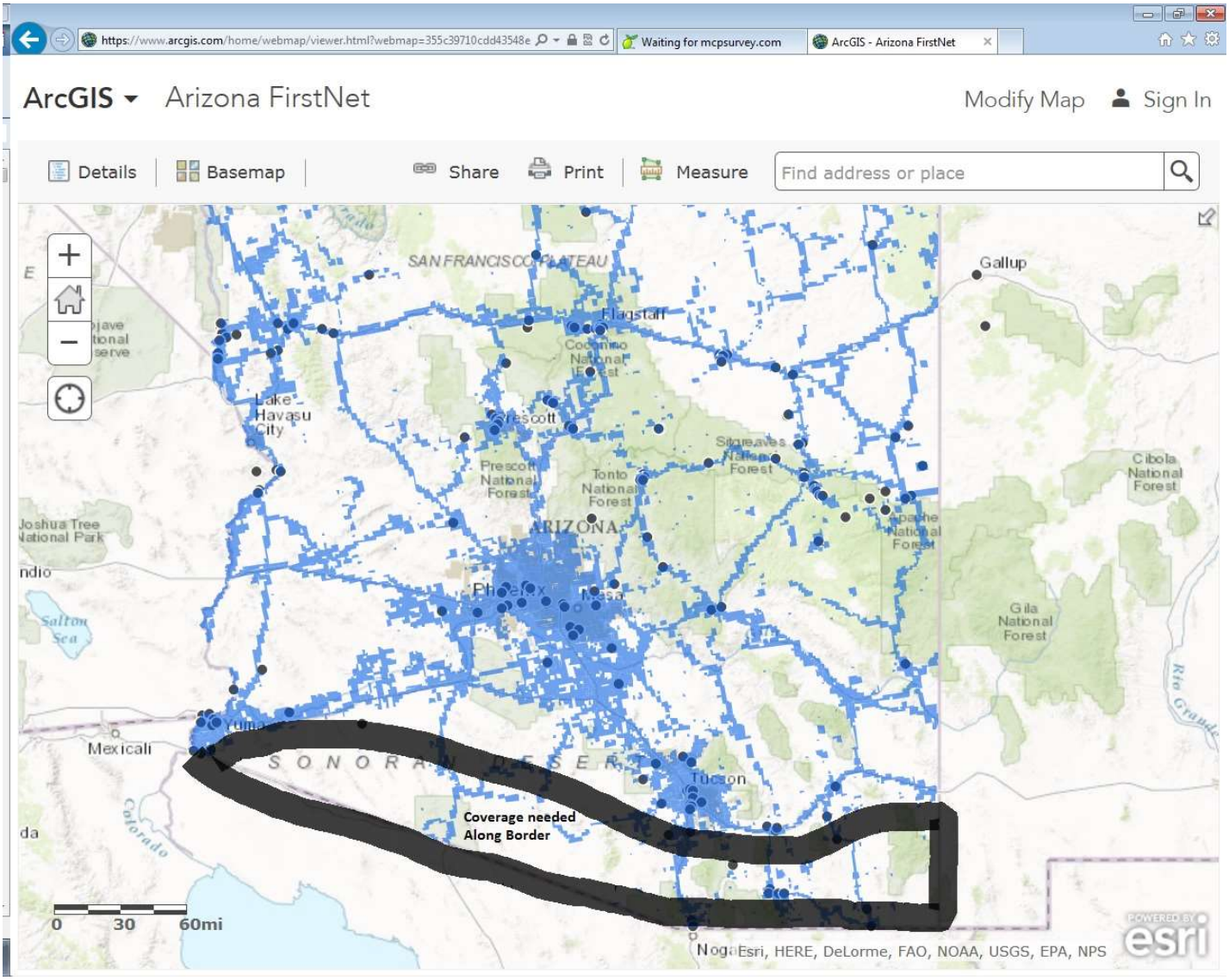
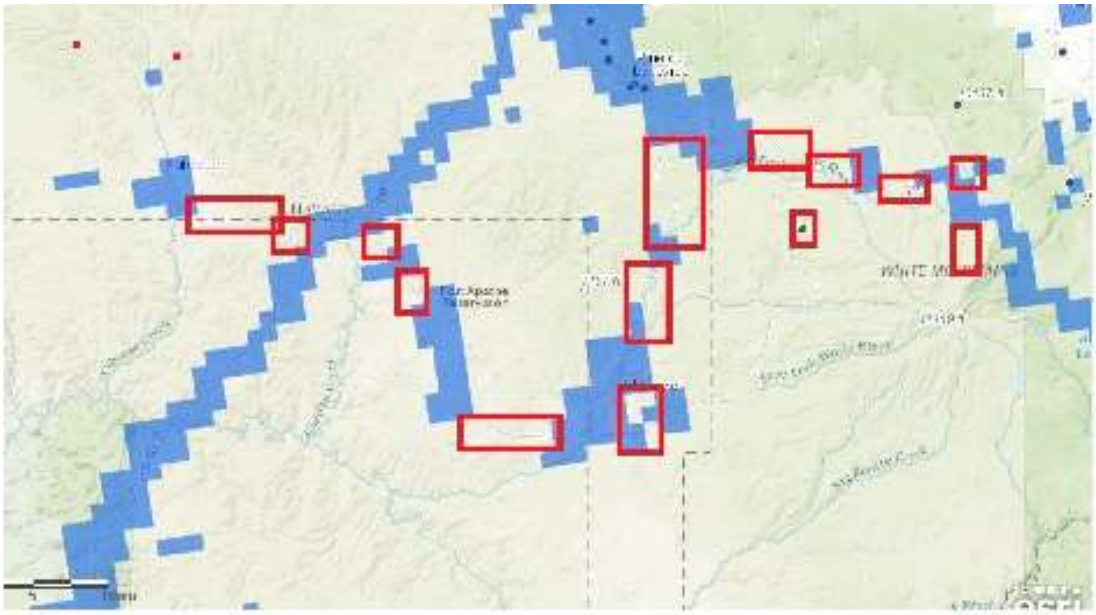


Figure 38: DEMA Submission of Southern Border Coverage Gaps

Figure 39 below was submitted by the Fort Apache Indian Reservation and depicts several areas that require coverage:



Major road system on the Fort Apache Indian Reservation have numerous Vehicle Accidents.

West side. Cibecue to Highway 60. BIA Route 12 has numerous Motor Vehicle Crashes.

Central: Highway 73 from Carrizo Southeast to Whiteriver then North to HonDah Junction.

East Side: US 260 is the main corridor for Sunrise Ski Park and Resort.

Boxes below US 260: The small town of Hawley Lake and the Sunrise Ski Park and Resort.

Figure 39: Fort Apache Indian Reservation

Figure 40 was submitted by the Arizona Department of Corrections and depicts the need for coverage along the Highway 87 corridor between Winslow and Payson due to daily inmate transports.

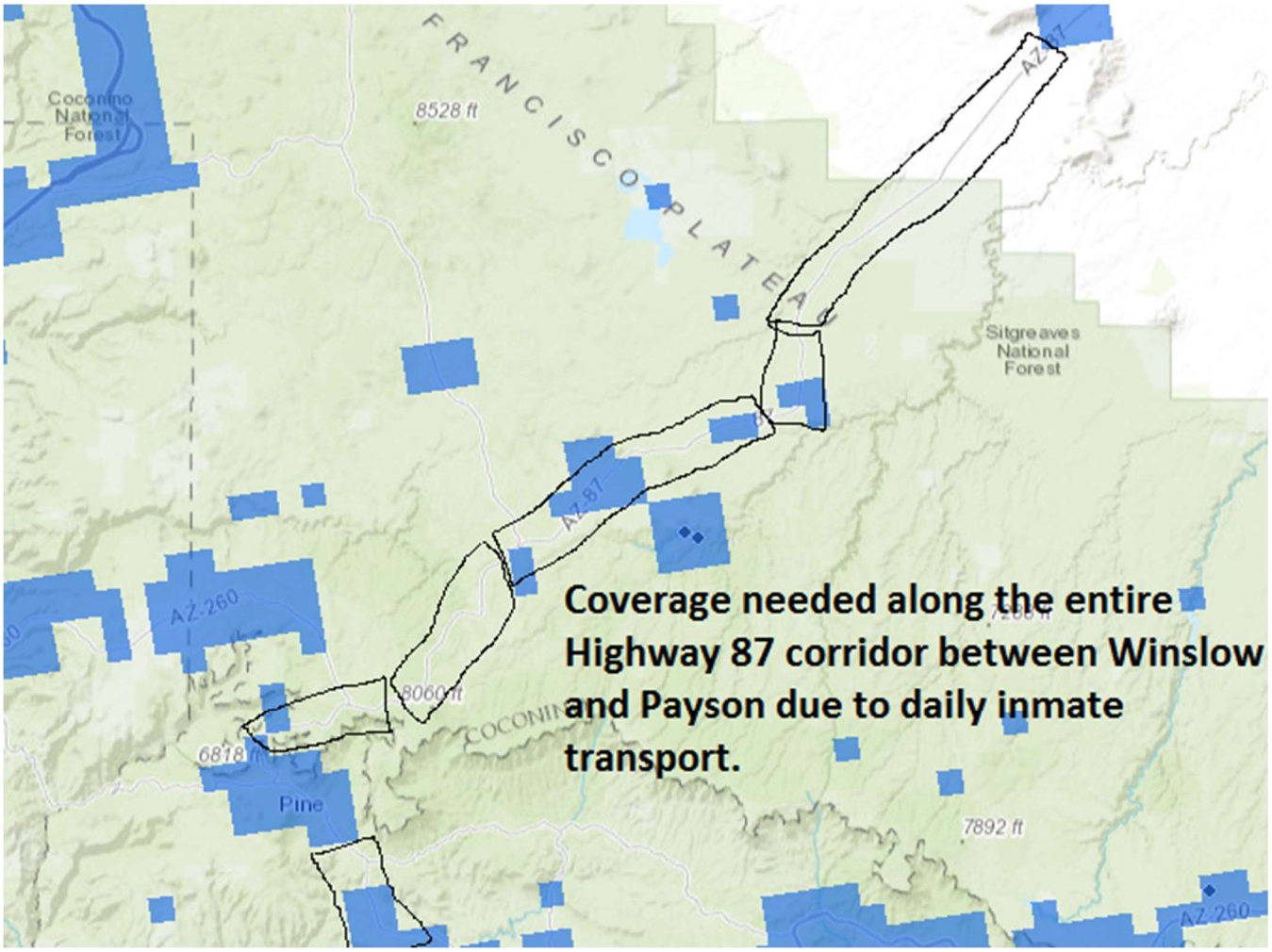


Figure 40: Arizona Department of Corrections Highway 87 Corridor

Figure 41 was submitted by the Arizona Game and Fish Department and illustrates the current land mobile radio (LMR) coverage across the state. As can be seen, LMR coverage has many gaps, so the hope is that the NPSBN can at least supplement that coverage.

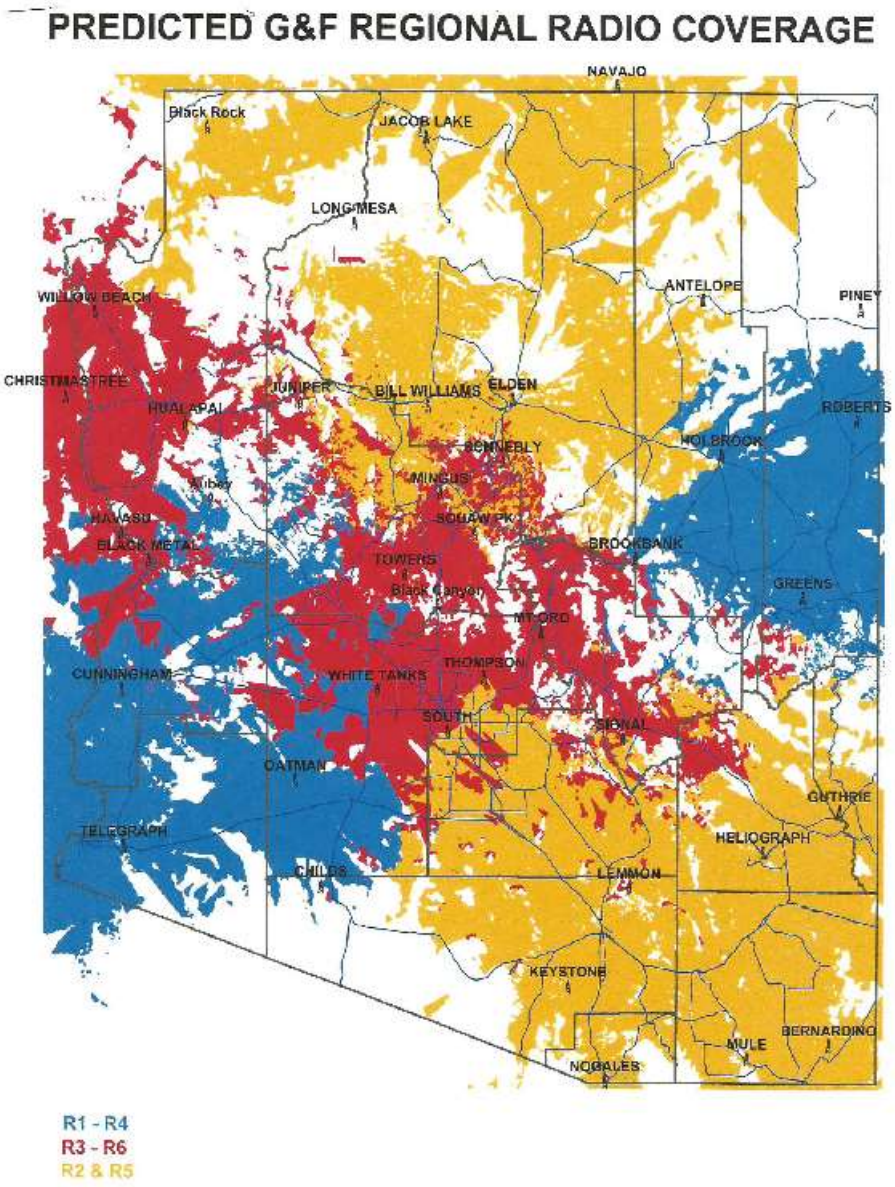


Figure 41: Arizona Game and Fish Current LMR Coverage

Figures 42 – 50 below were submitted by Yavapai County and depict several areas in need of coverage.

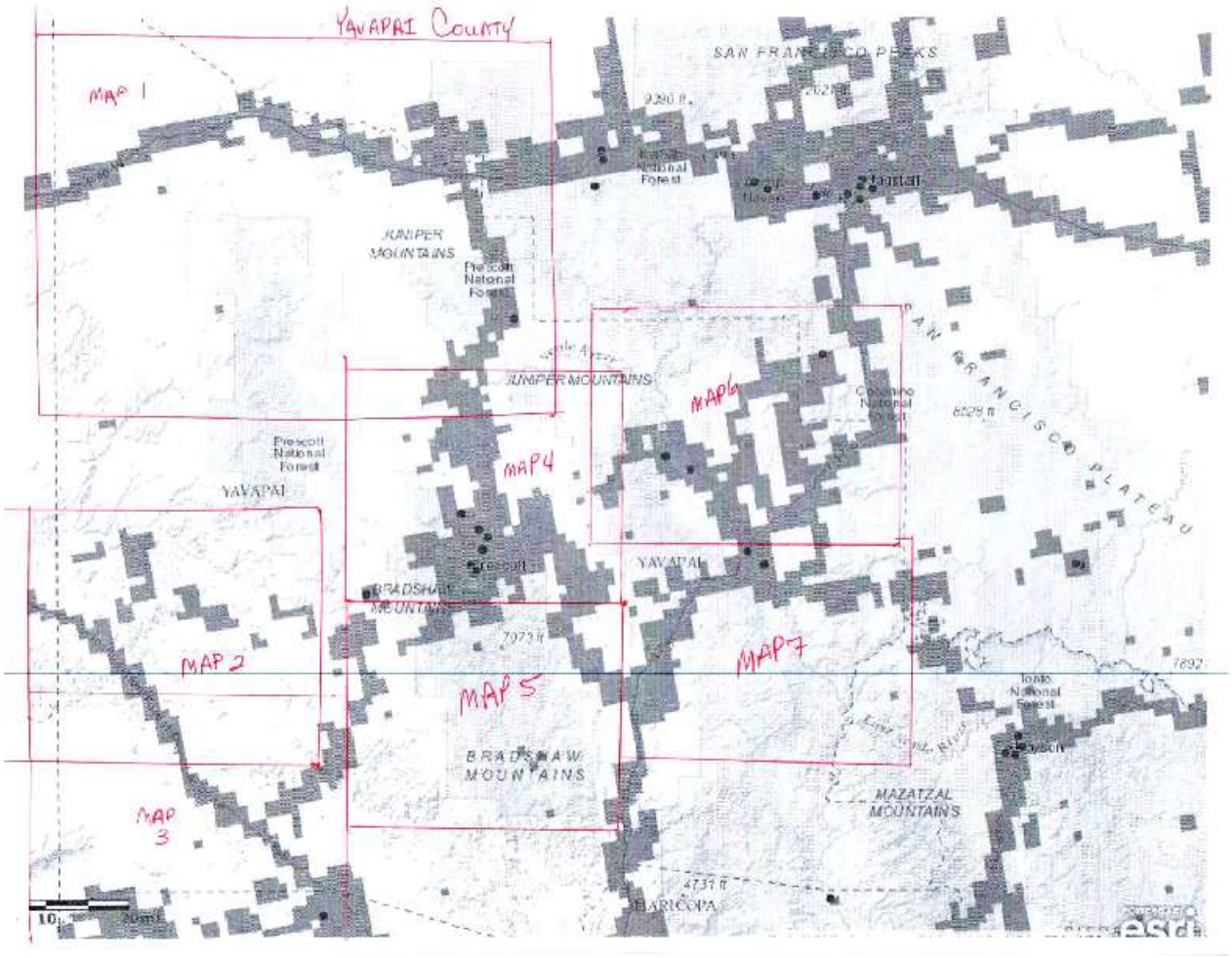


Figure 42: Yavapai County

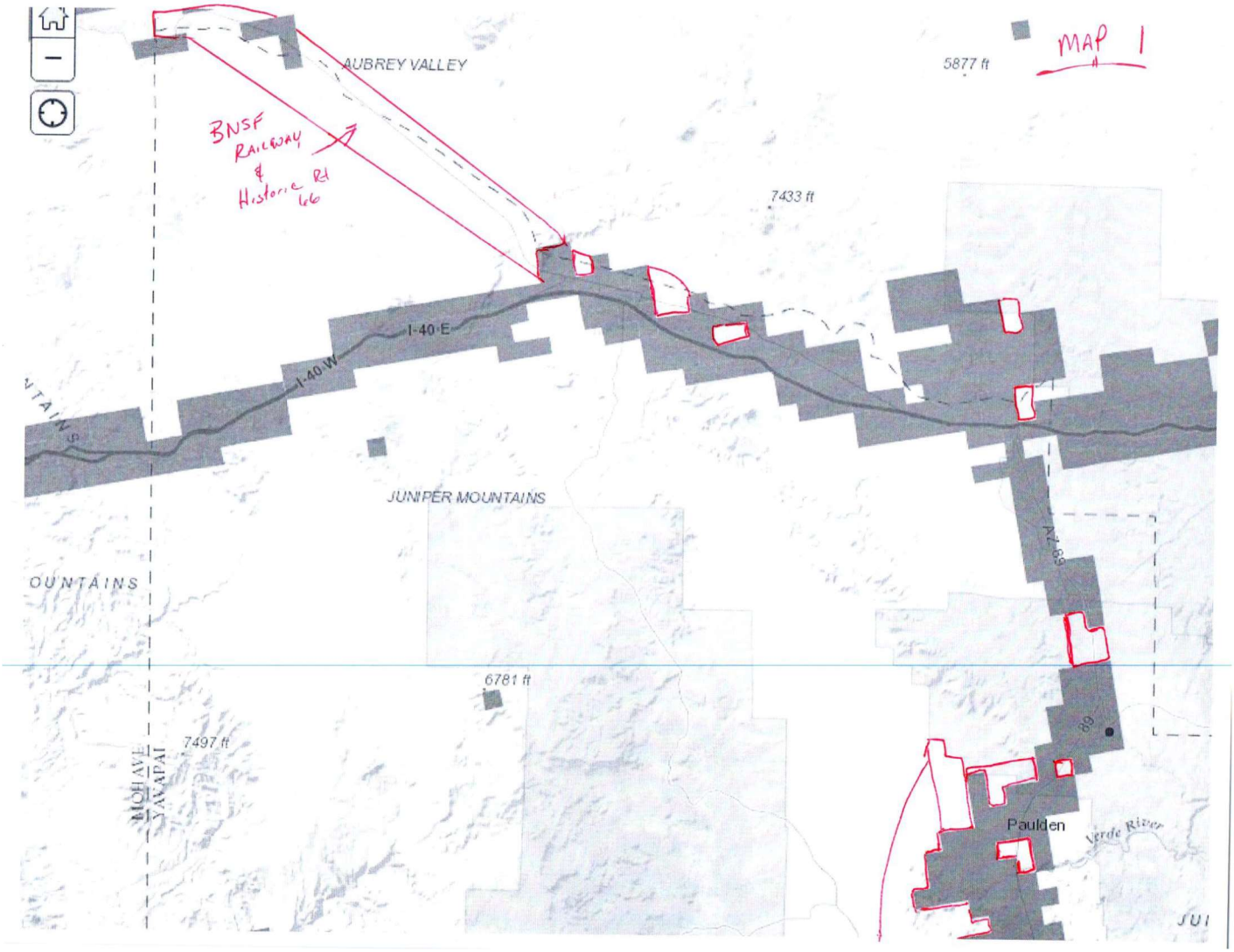


Figure 43: Yavapai County Map 1

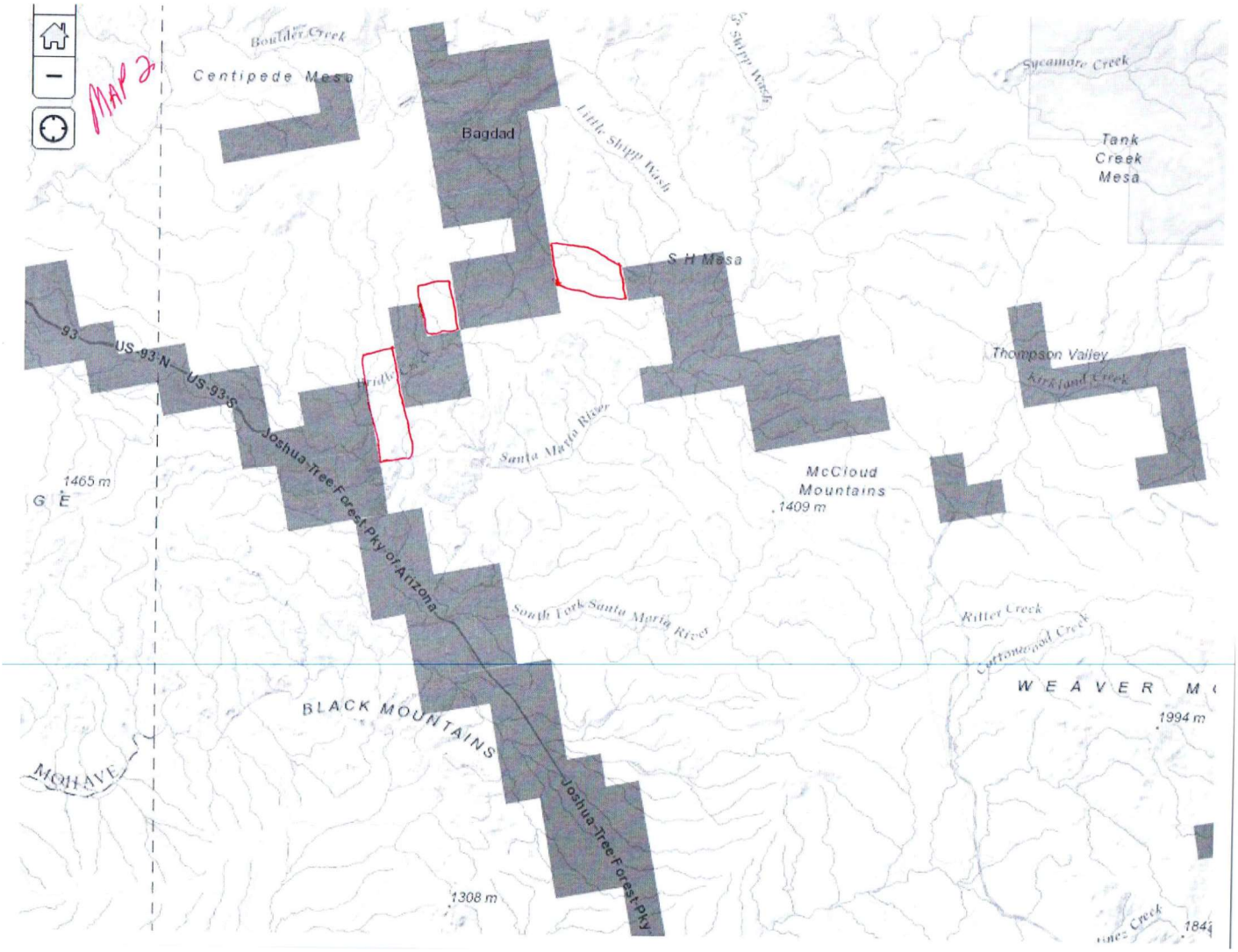


Figure 44: Yavapai County Map 2

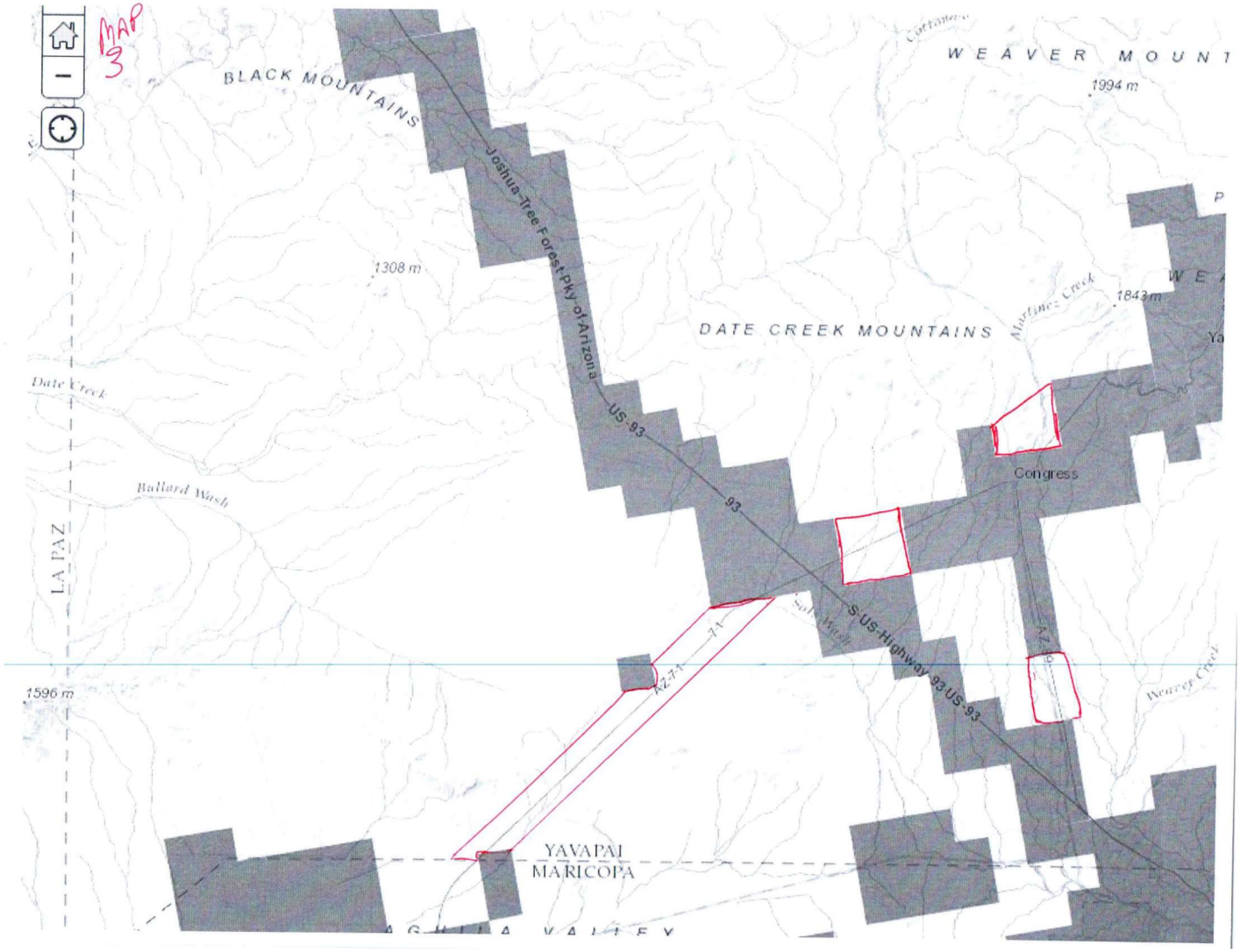


Figure 45: Yavapai County Map 3

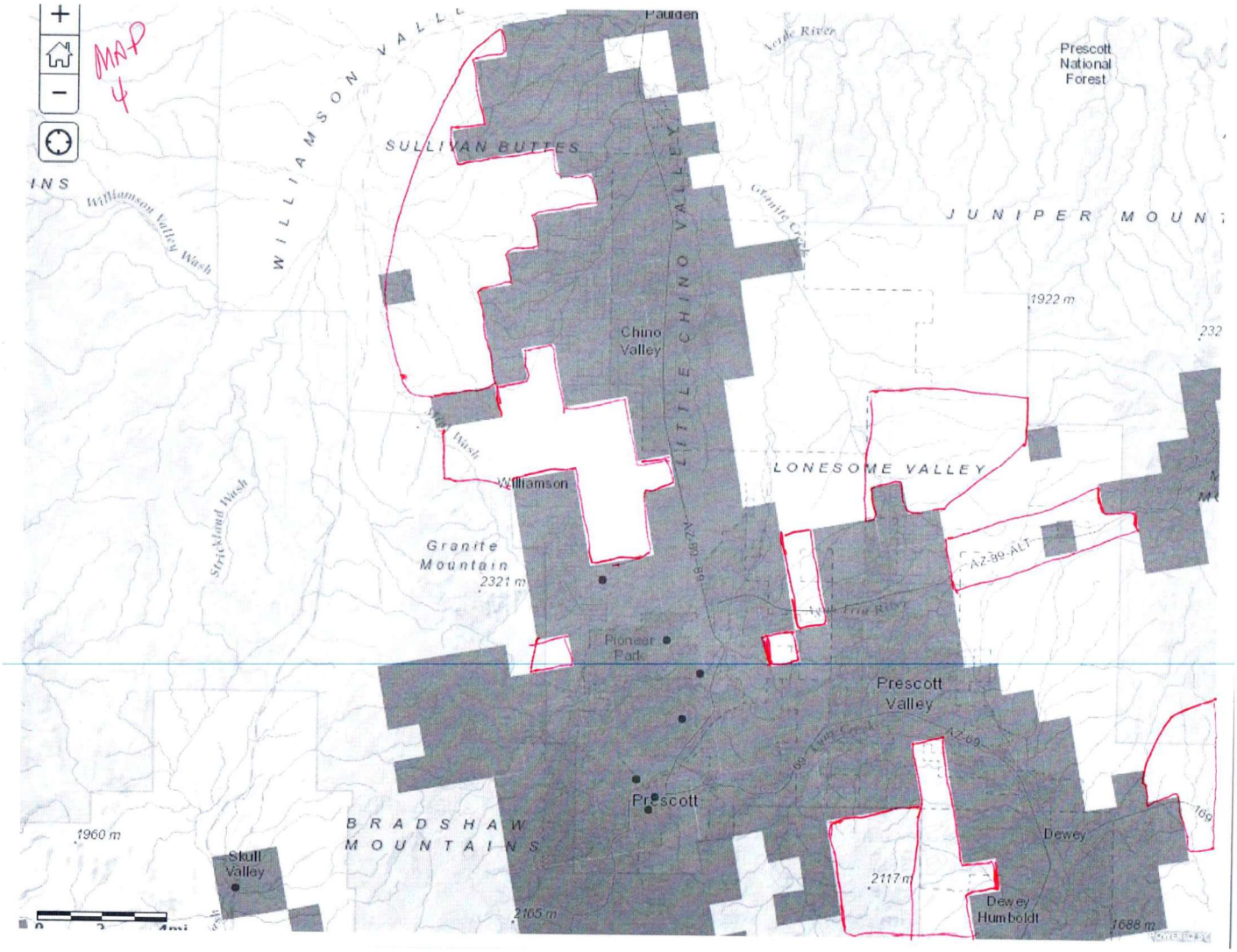


Figure 46: Yavapai County Map 4

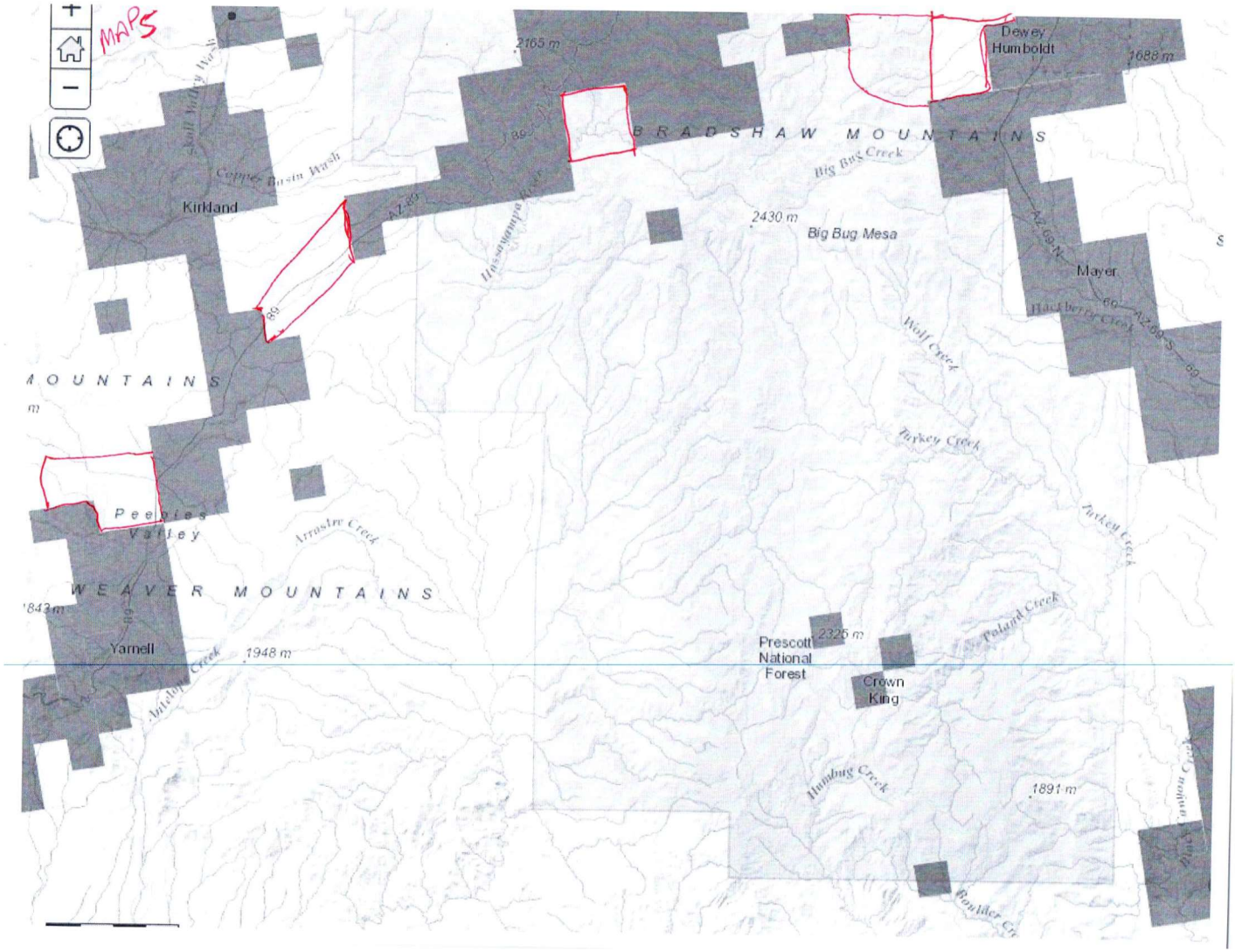


Figure 47: Yavapai County Map 5

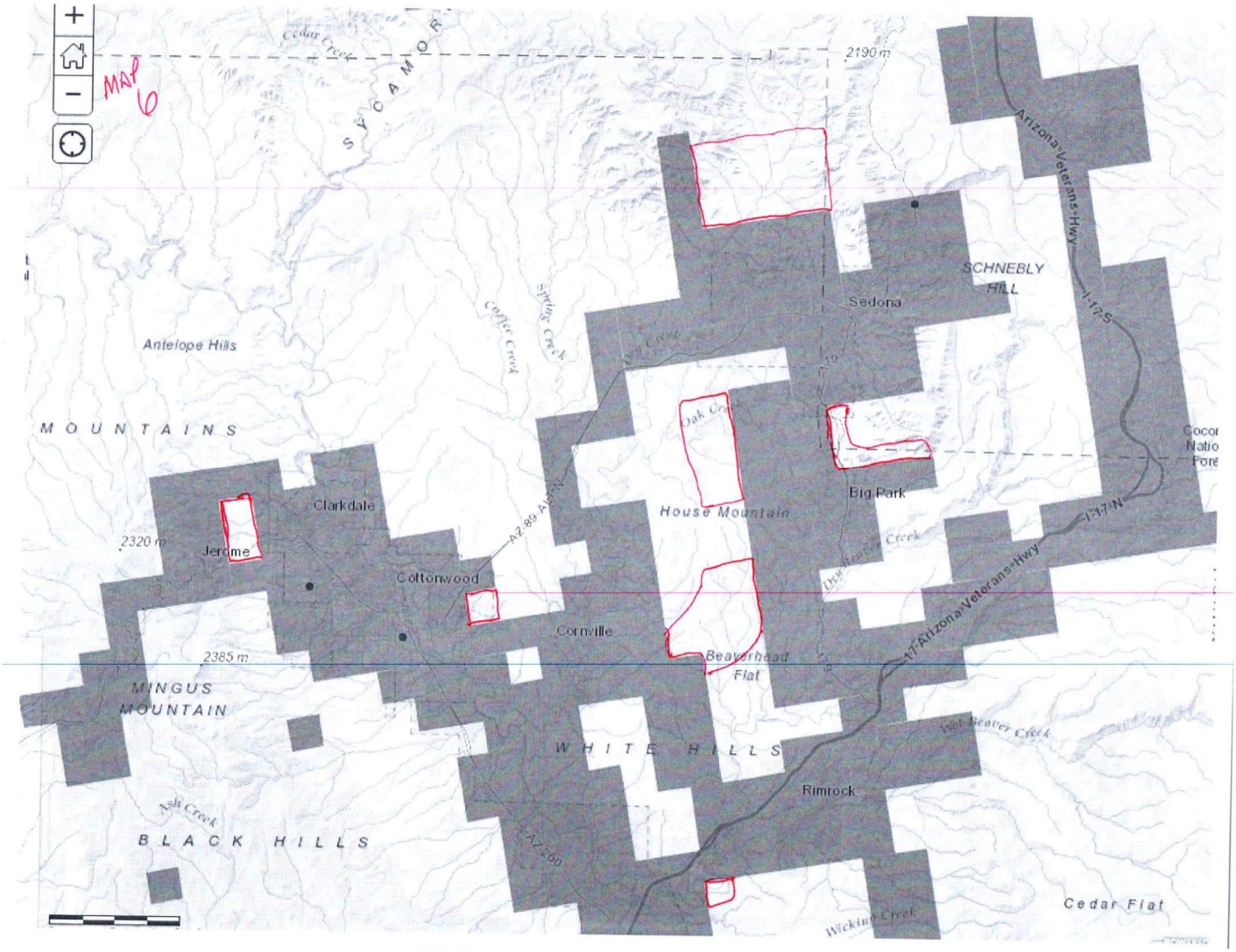


Figure 48: Yavapai County Map 6

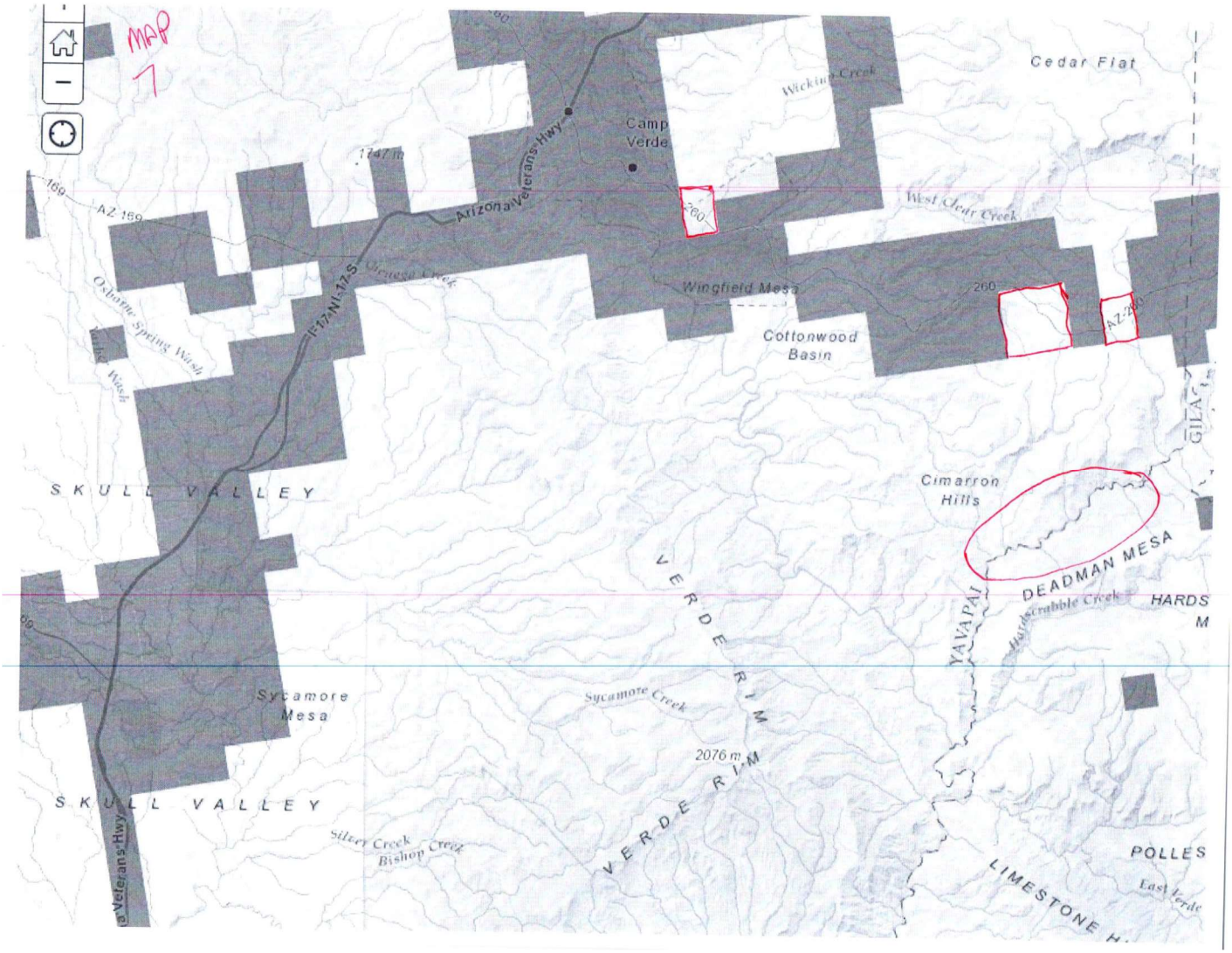


Figure 49: Yavapai County Map 7

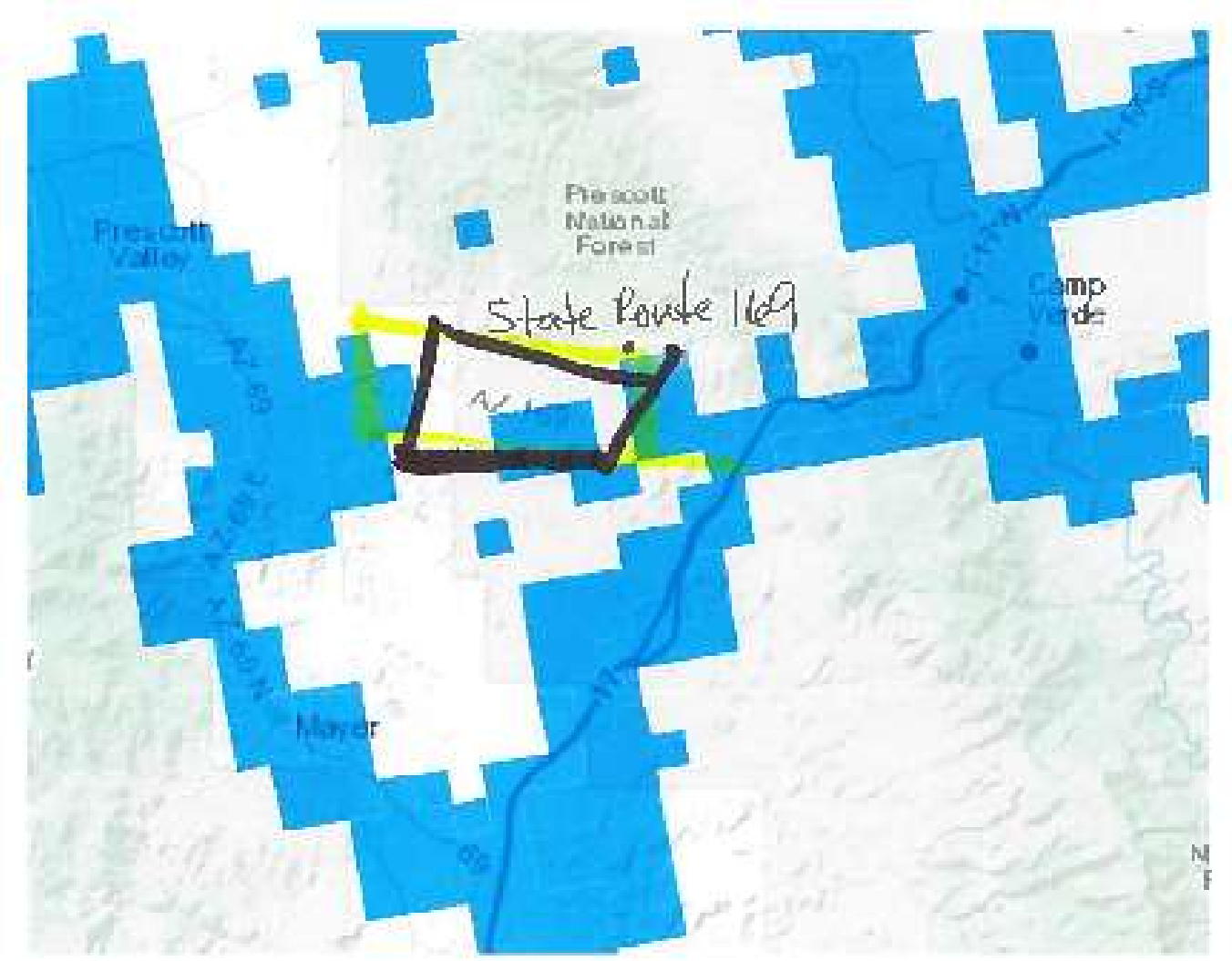
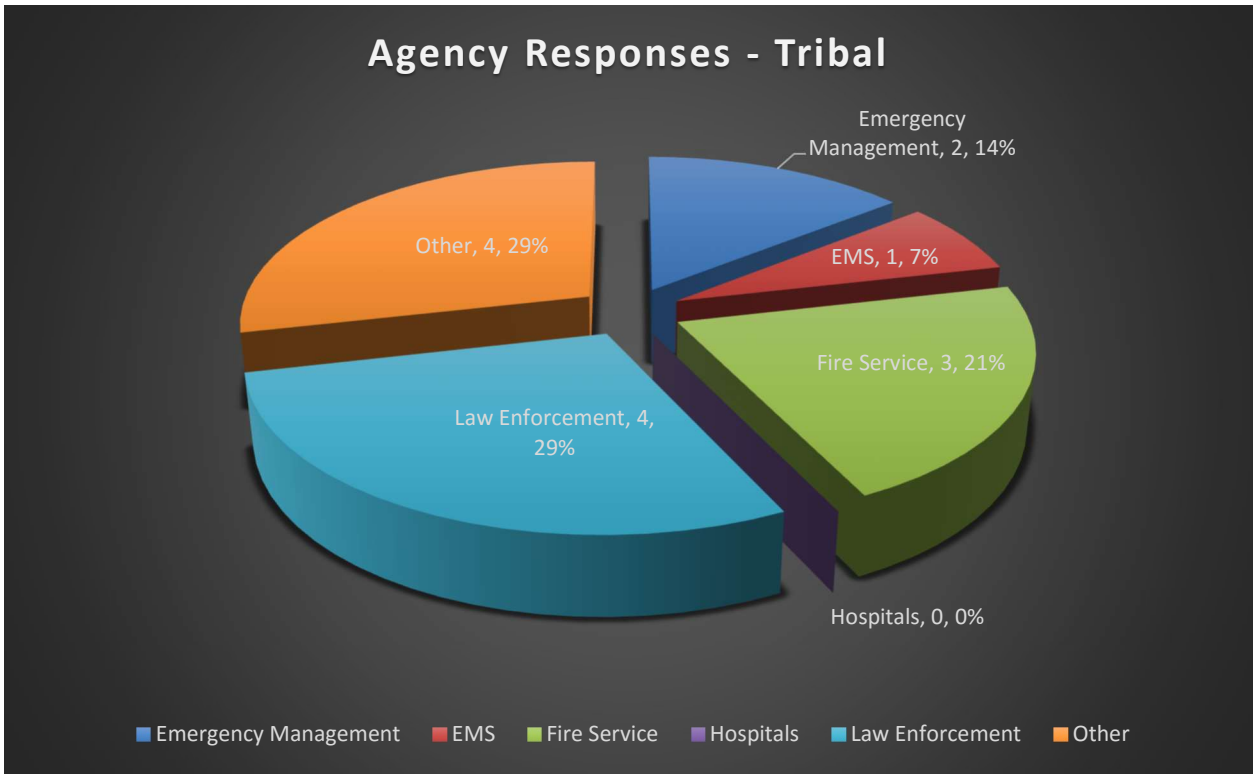


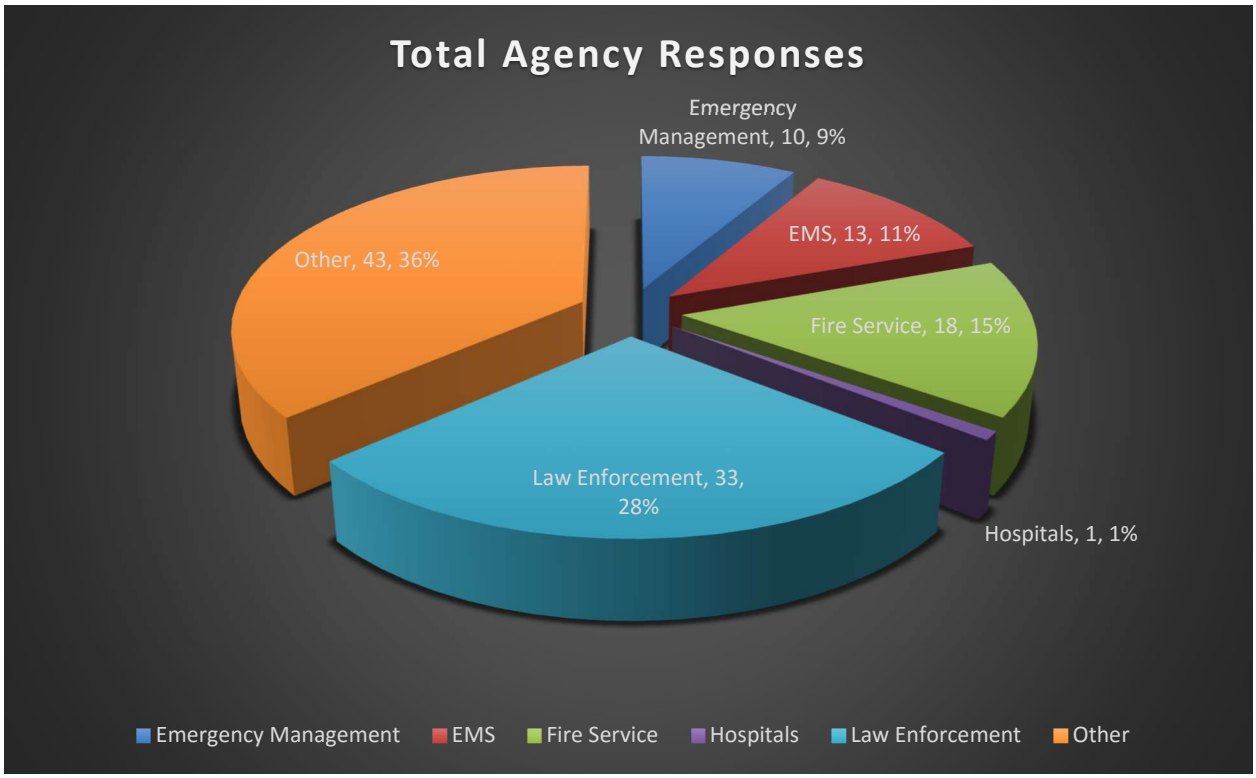
Figure 50: Yavapai County State Route 169 Submission

3.2. USERS AND OPERATIONAL AREAS

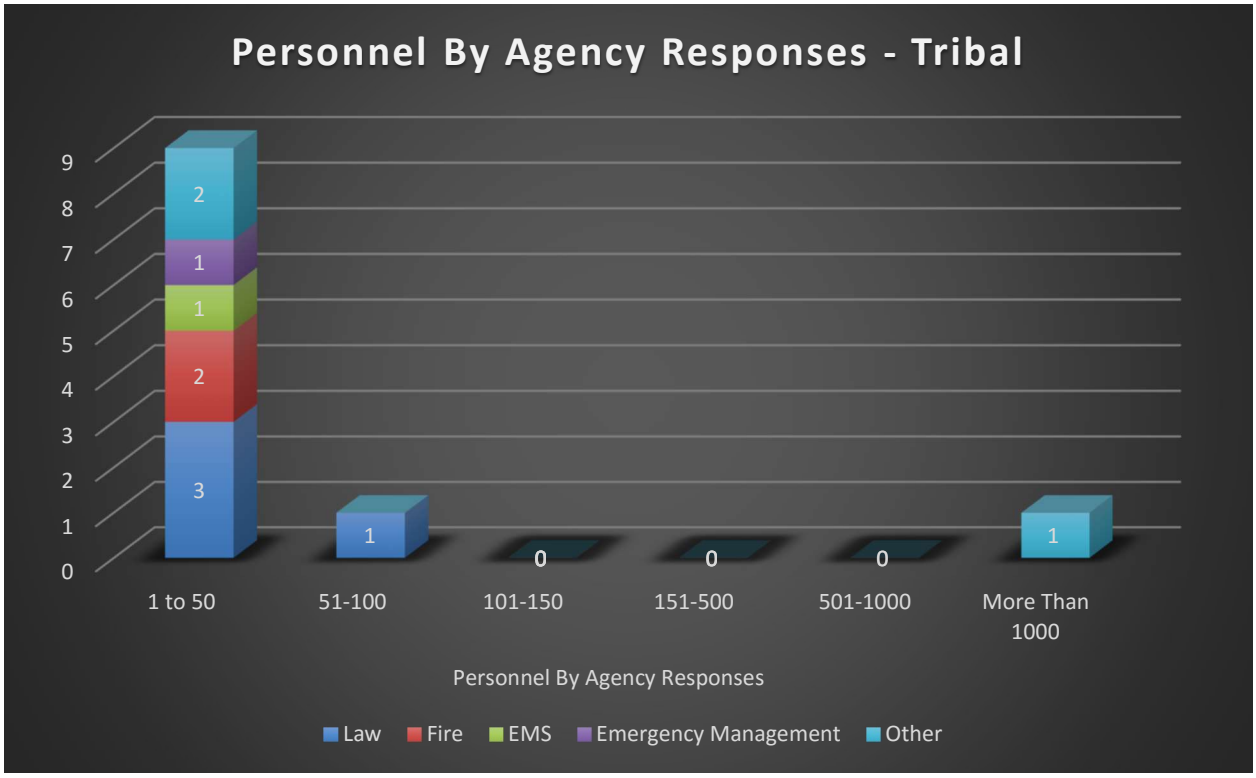
3.2.1. Responding Agencies

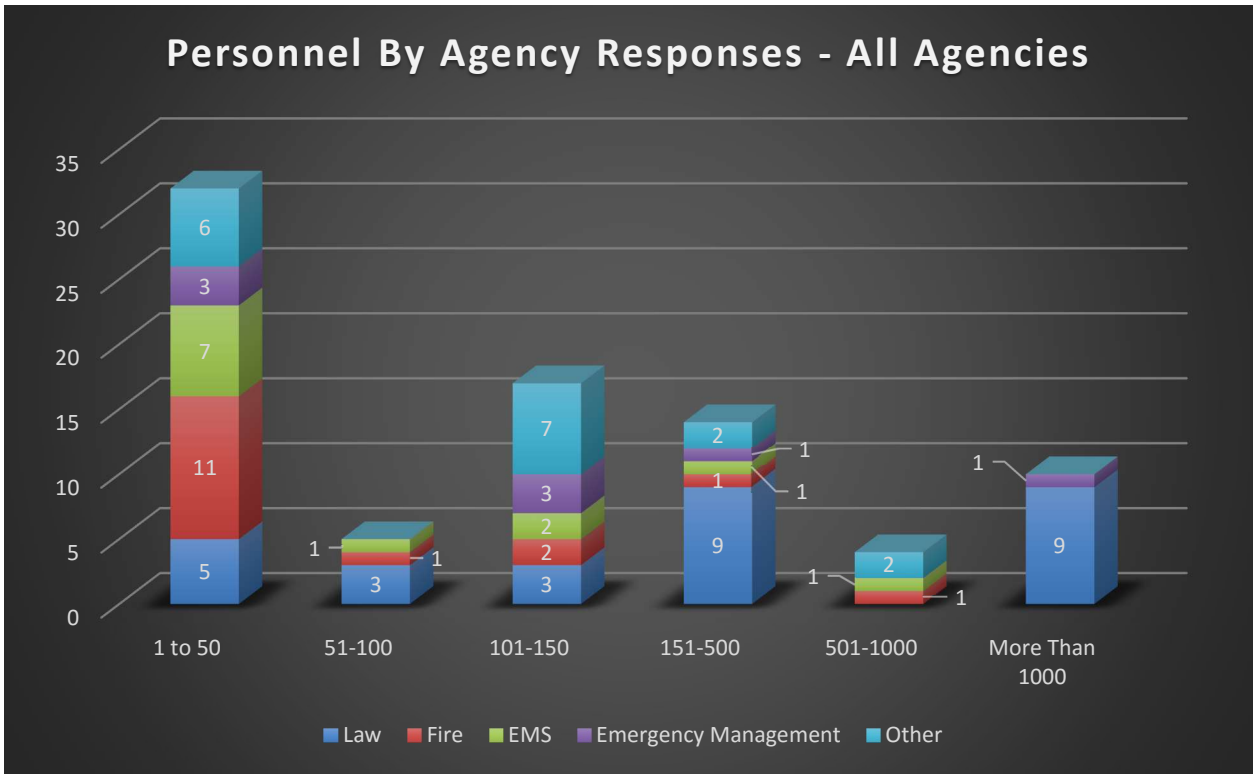
As previously stated, the State disseminated two surveys consisting of the same questions, with one of the surveys dedicated to Tribal public safety agencies, and the other to non-Tribal public safety agencies. The charts below reflect the results of the Tribal survey, and then the combined results for Tribal and non-Tribal agencies. It should be noted that many agencies serve multiple disciplines—e.g., law enforcement, fire, emergency medical services (EMS) and emergency management—which is why only seven agencies responded to the Tribal survey, but 14 disciplines are represented by those responses.


Agency Responses - Tribal
Emergency Management, 2, 14%
EMS, 1, 7%
Fire Service, 3, 21%
Hospitals, 0, 0%
Law Enforcement, 4, 29%
Other, 4, 29%
Emergency Management
EMS
Fire Service
Hospitals
Law Enforcement
Other


Total Agency Responses
Emergency Management, 10, 9%
EMS, 13, 11%
Fire Service, 18, 15%
Hospitals, 1, 1%
Law Enforcement, 33, 28%
Other, 43, 36%
Emergency Management
EMS
Fire Service
Hospitals
Law Enforcement
Other

Survey responses were received from agencies of varying size.





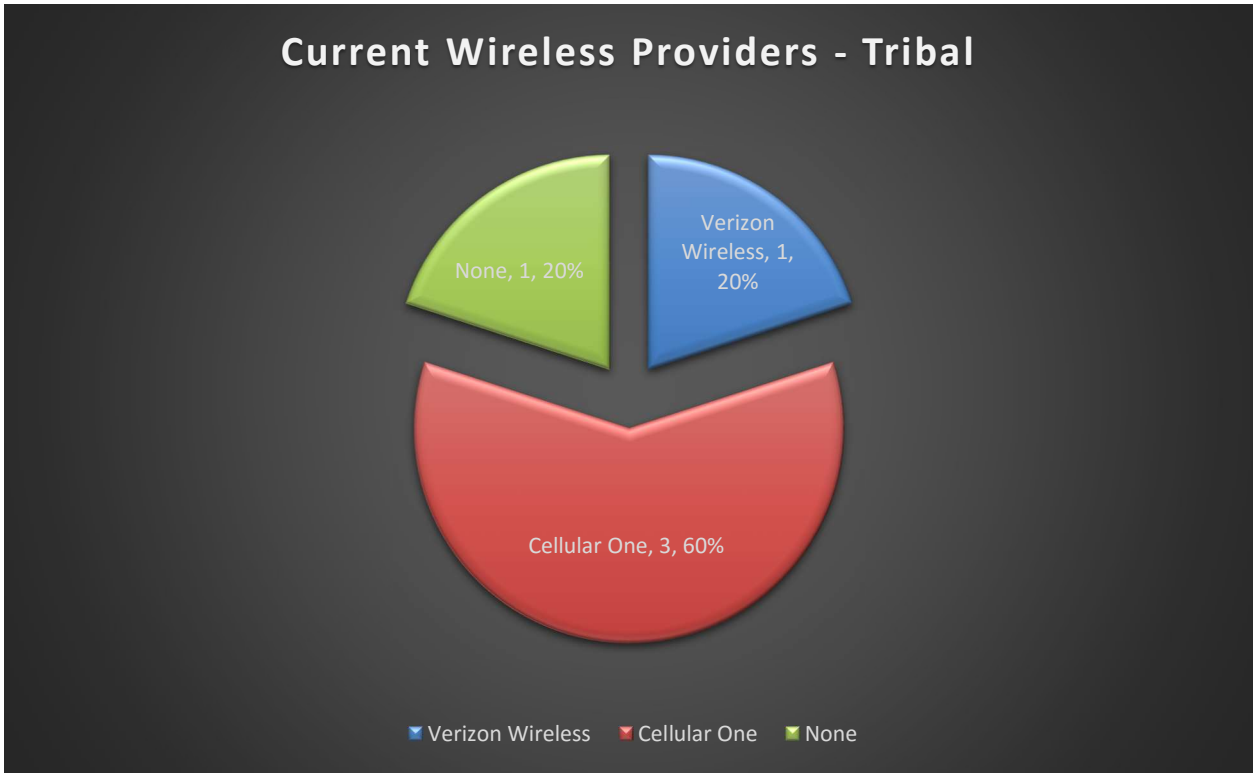
3.3. CAPACITY PLANNING

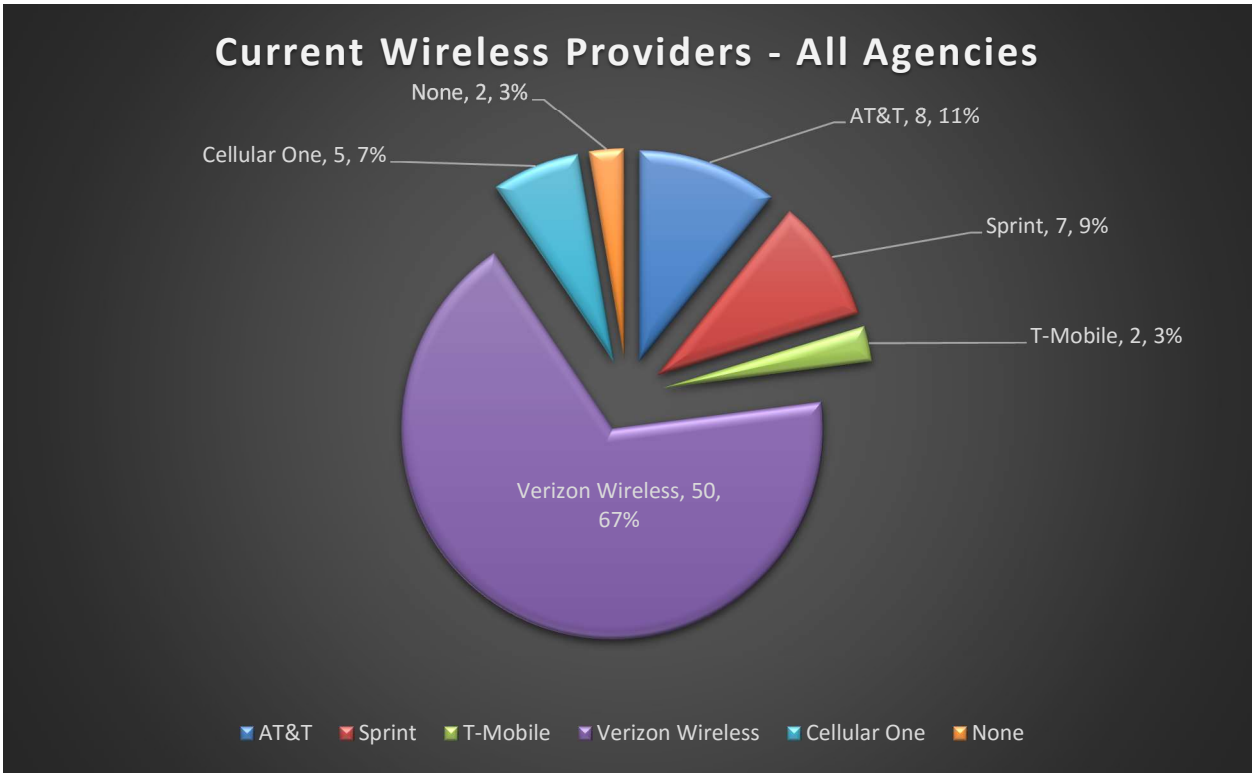
Capacity planning is especially significant in the urban/suburban areas where Arizona wants to ensure that the network provides adequate capacity for the number of users. The primary areas within the State where the network must ensure adequate capacity are the Phoenix and Tucson metropolitan areas, and the areas around the Grand Canyon and the town of Sedona, two of the state's most popular tourist destinations. Capacity planning not only needs to ensure adequate capacity on a normal day-to-day basis, but also must consider the possibility of a large number of devices operating in a small area during a multijurisdictional response to a significant emergency incident(s). Surveys were utilized to collect capacity planning data, including current data usage, the number of devices currently in use, and current and desired data application usage. Following are the results of those data-collection efforts.

3.3.1. Devices

3.3.1.1. Current Wireless Data Service

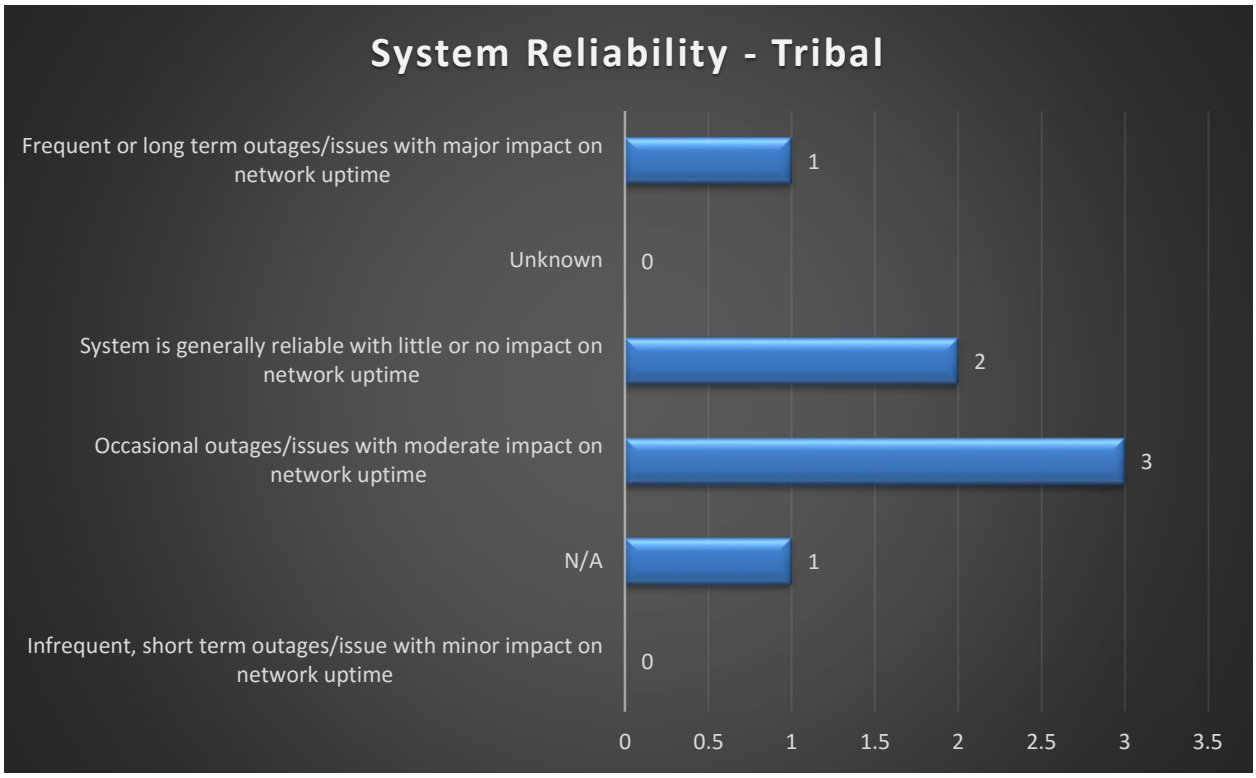
The charts below indicate which wireless providers are being utilized by responding agencies:

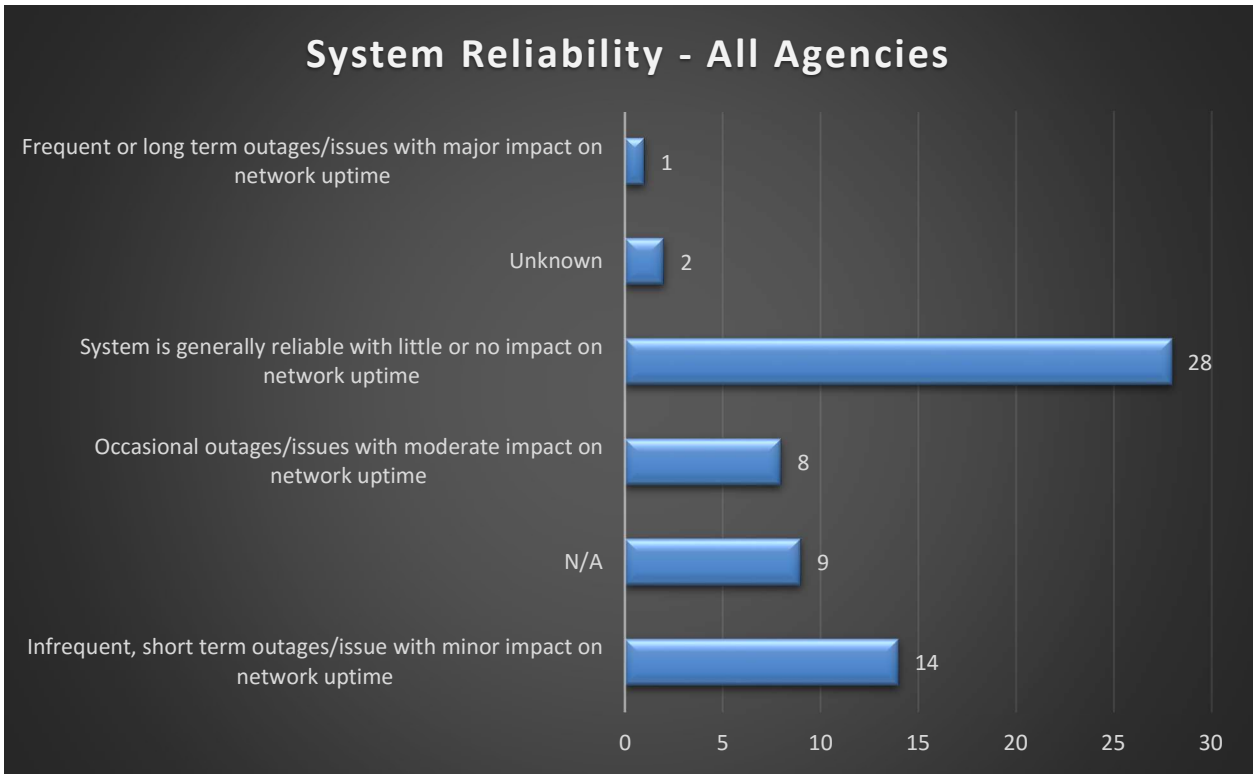



Current Wireless Providers - All Agencies
None, 2, 3%
AT&T, 8, 11%
Cellular One, 5, 7%
Sprint, 7, 9%
T-Mobile, 2, 3%
Verizon Wireless, 50, 67%
AT&T
Sprint
T-Mobile
Verizon Wireless
Cellular One
None

3.3.2. Current System Reliability

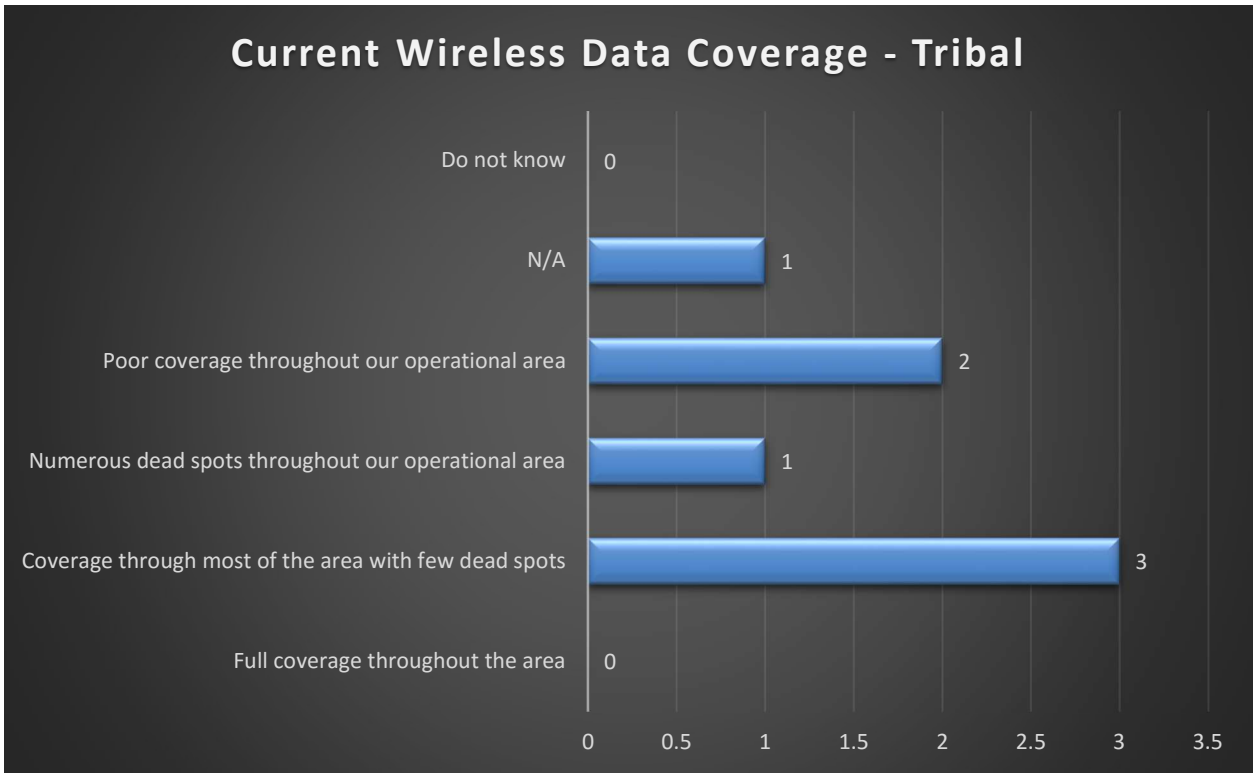
The following charts reflect the respondents' opinion of the reliability of their current wireless service, and how it impacts their operations:

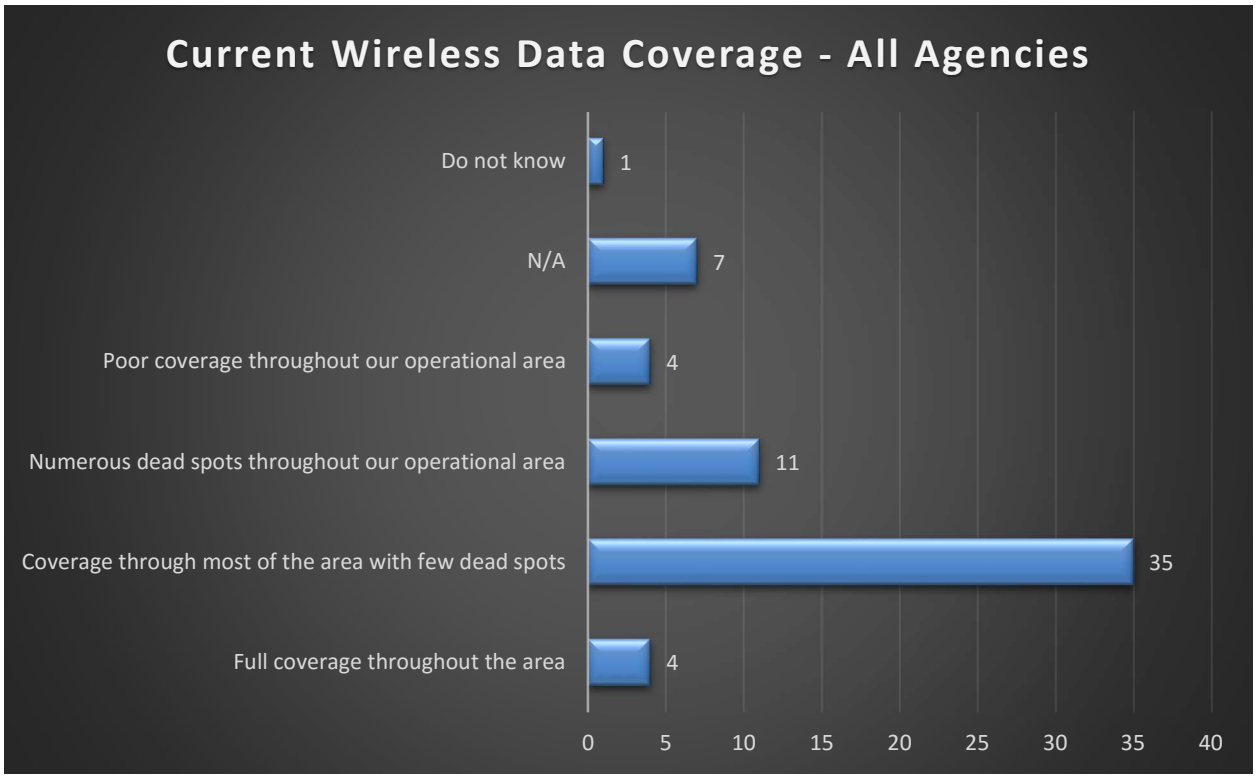




3.3.3. Current System Coverage

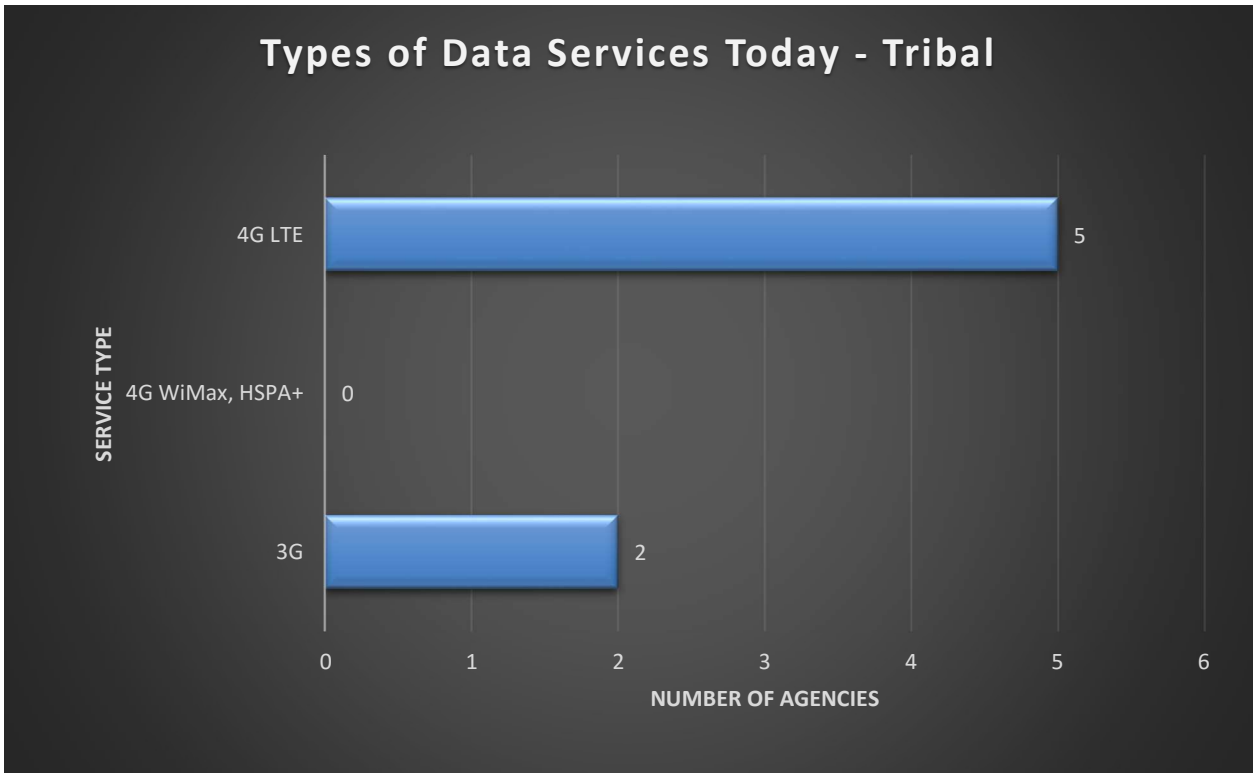
The charts below depict the opinions of the responding agencies regarding the quality of the coverage of their current wireless data system:

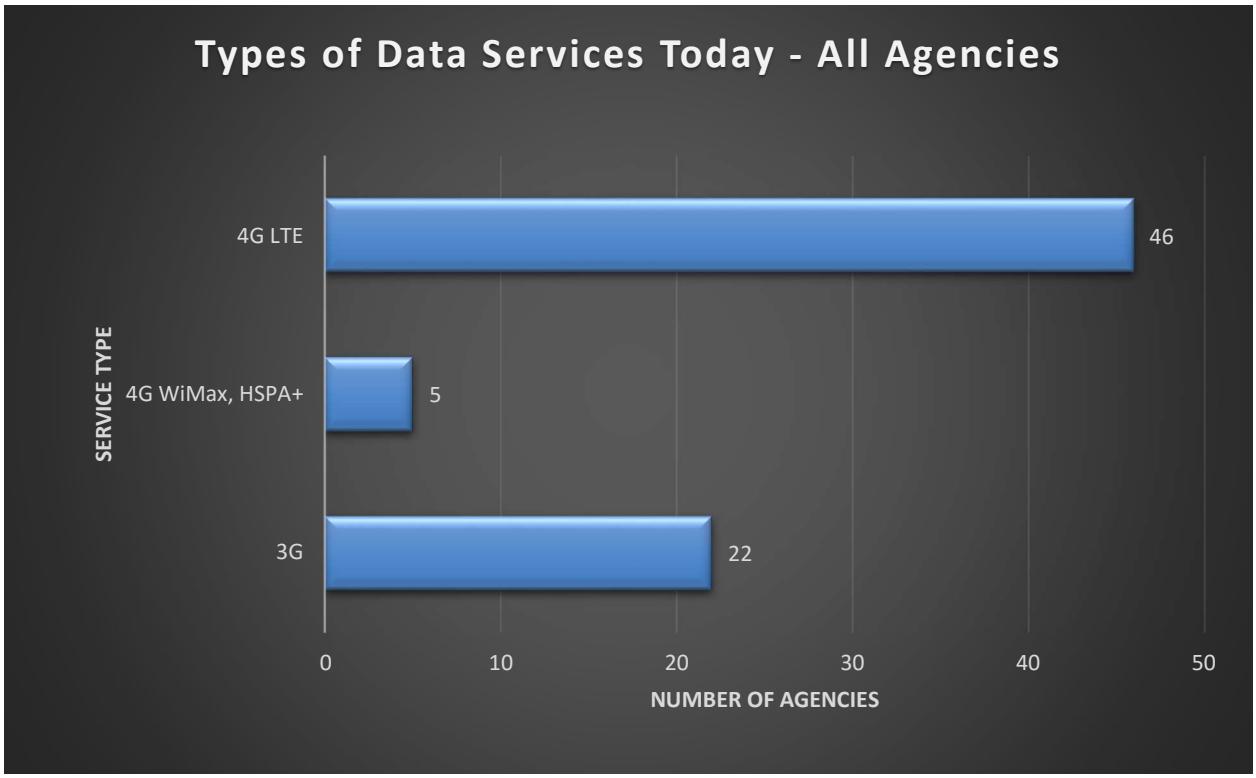




3.3.4. Types of Data Services

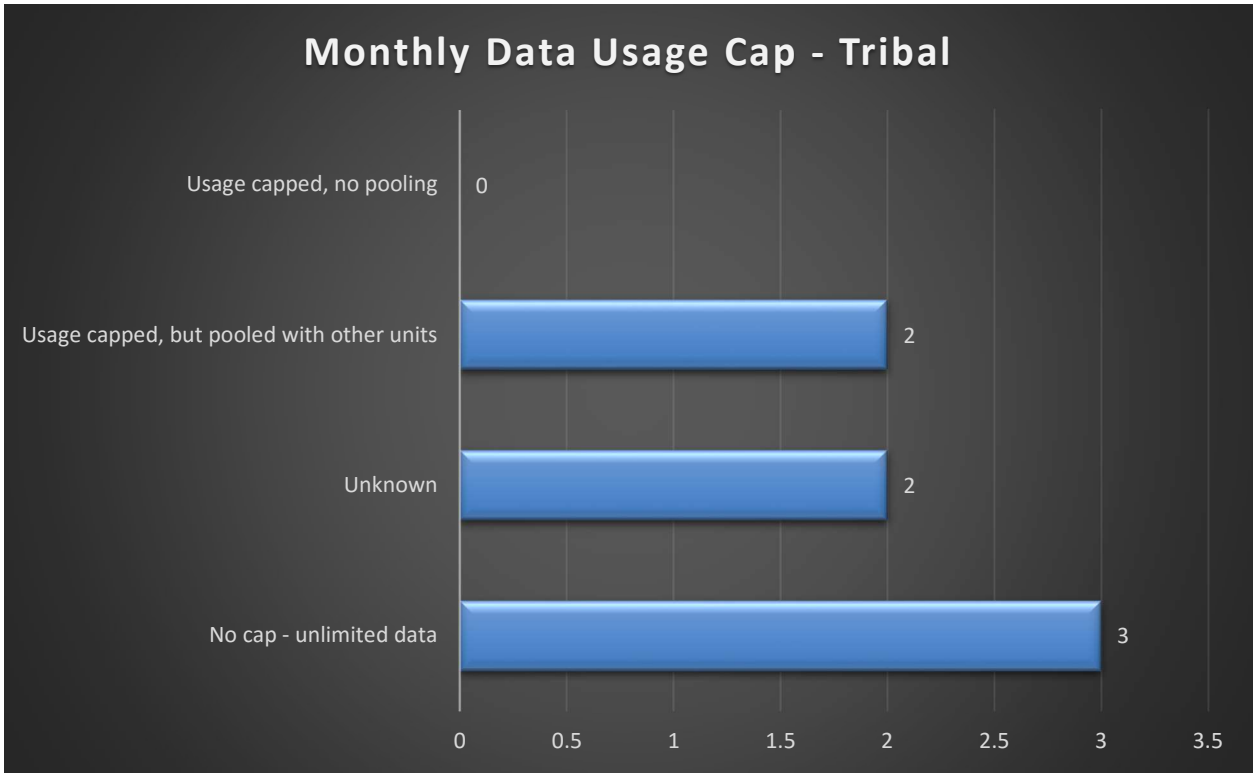
The following charts illustrate the types of data services agencies currently utilize:

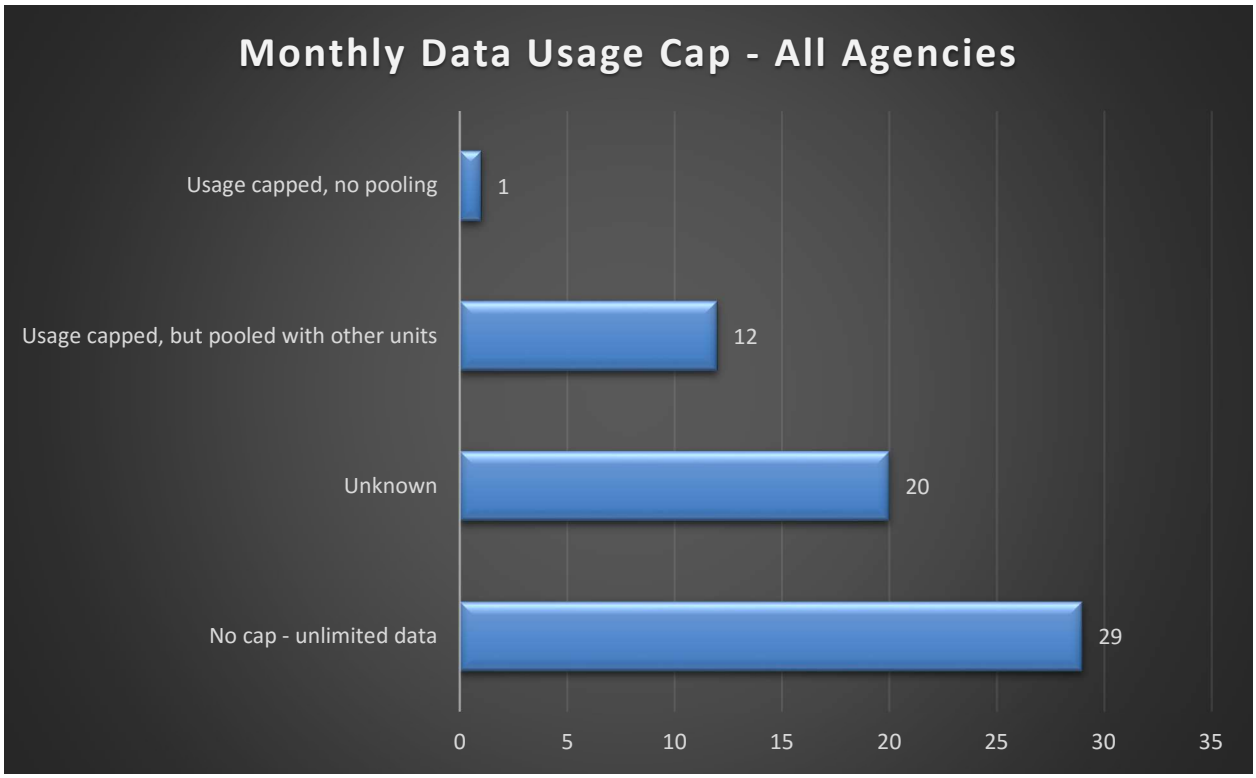




3.3.5. Data Usage Caps

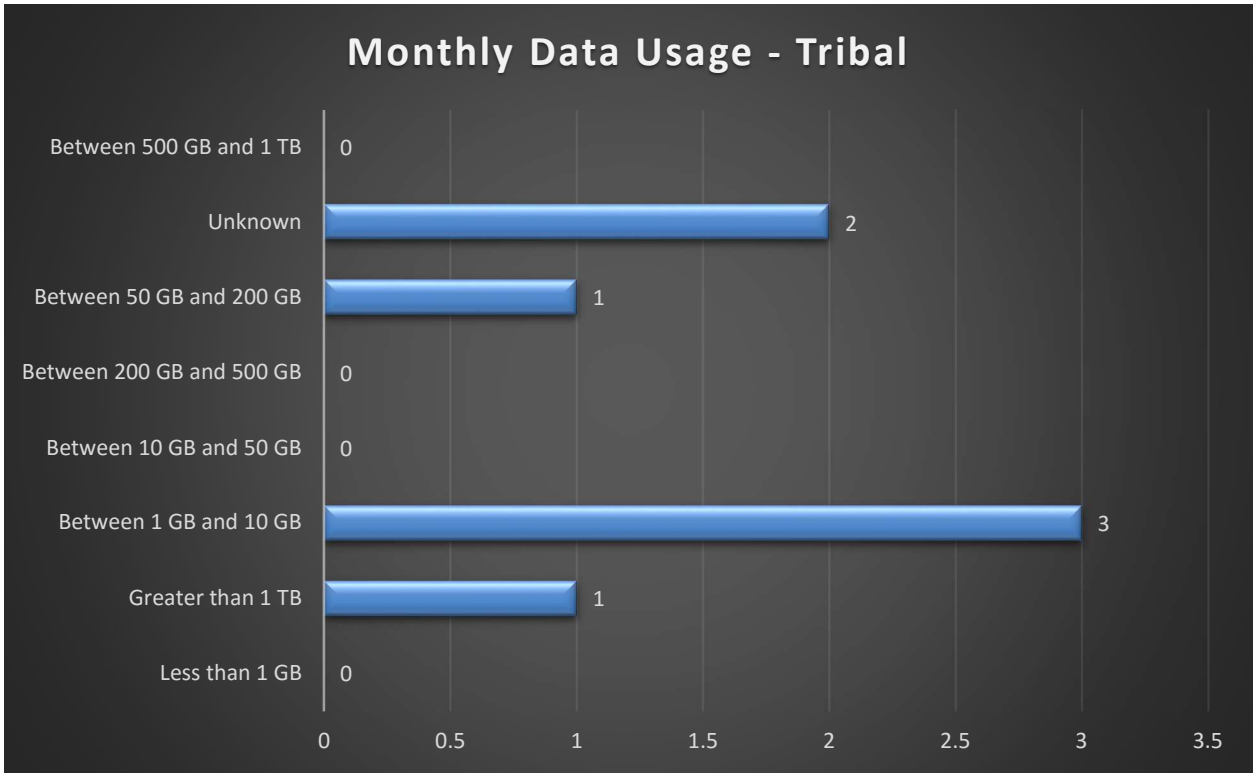
The following charts represent monthly data usage caps as reported by responding agencies:

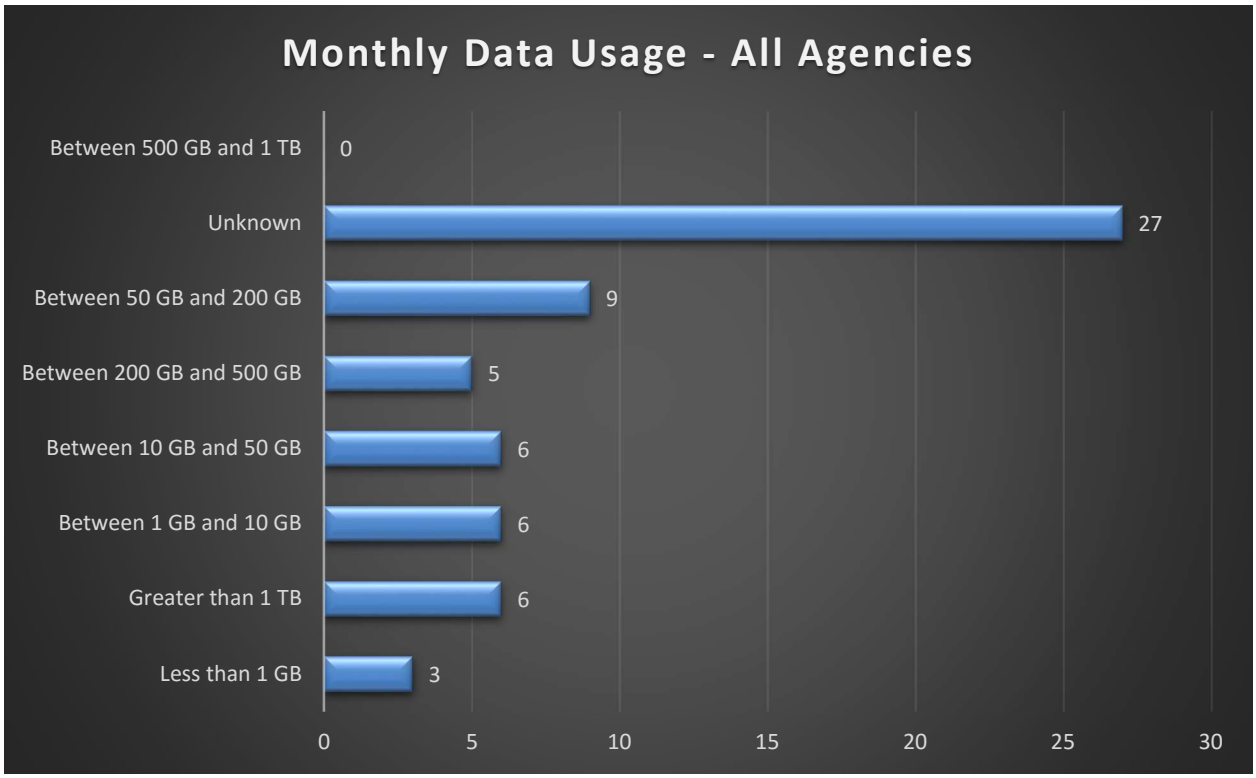




3.3.6. Monthly Data Usage

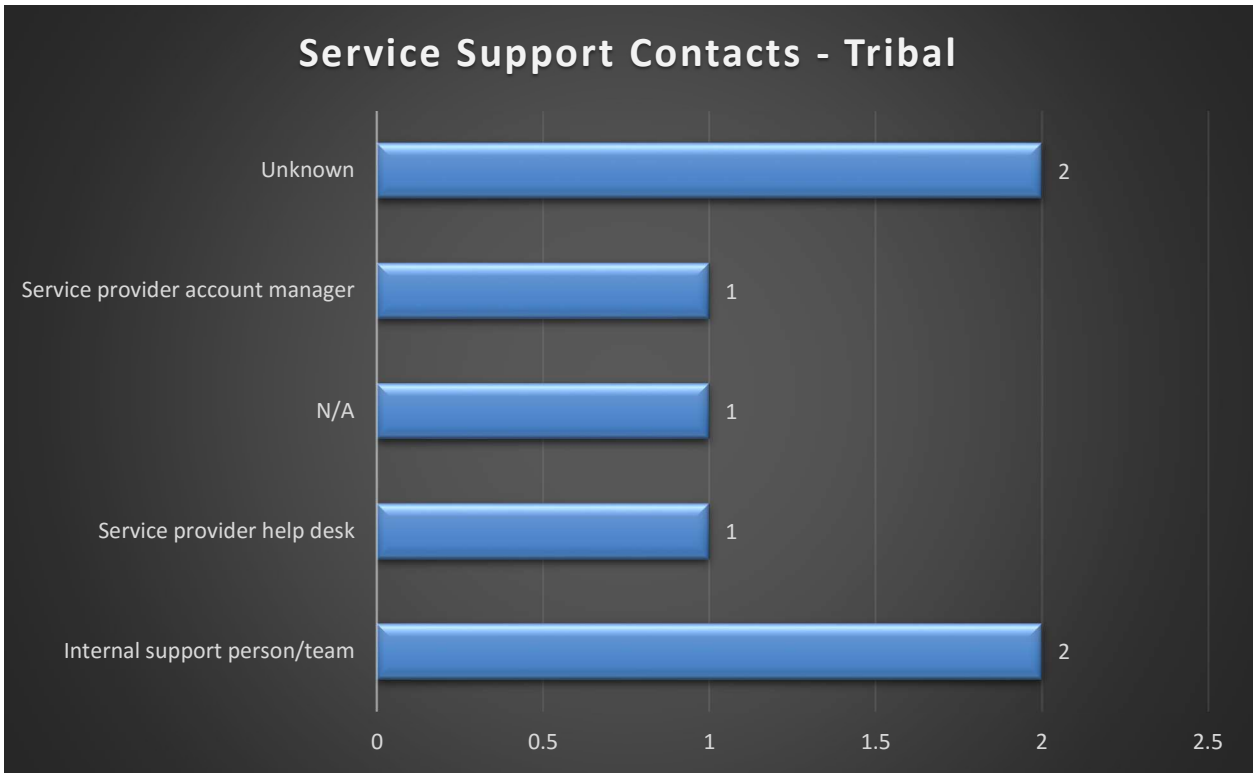
The following charts represent reporting agencies' monthly data usage:

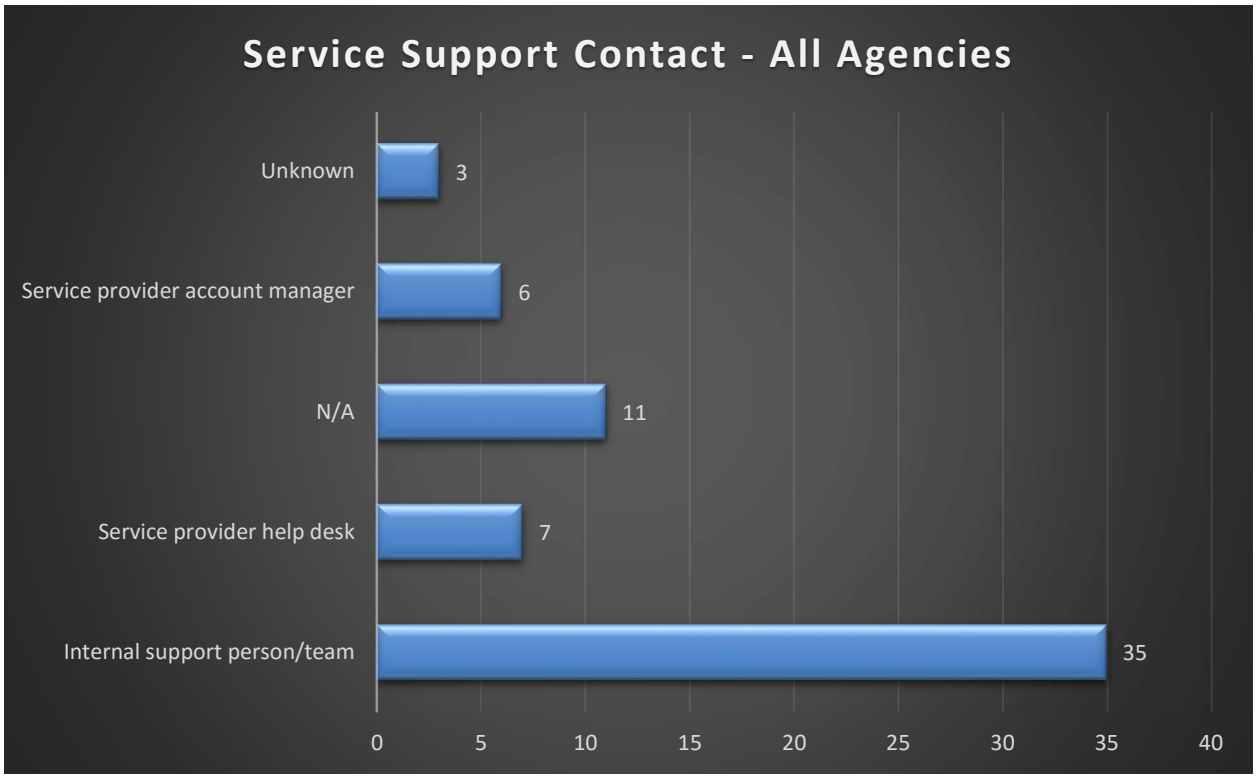




3.3.7. Service Support Contact

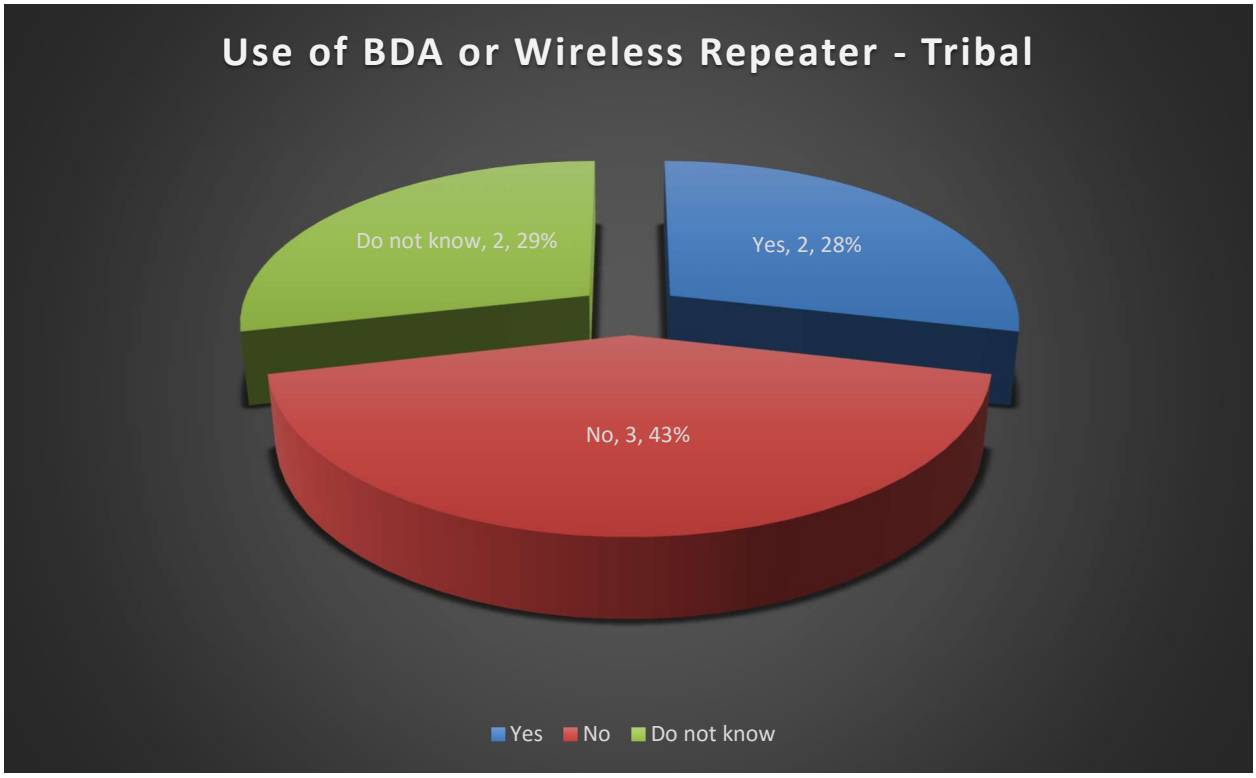
Respondents were asked to provide their main point of contact for their current wireless data service issues. The charts below depict those responses:

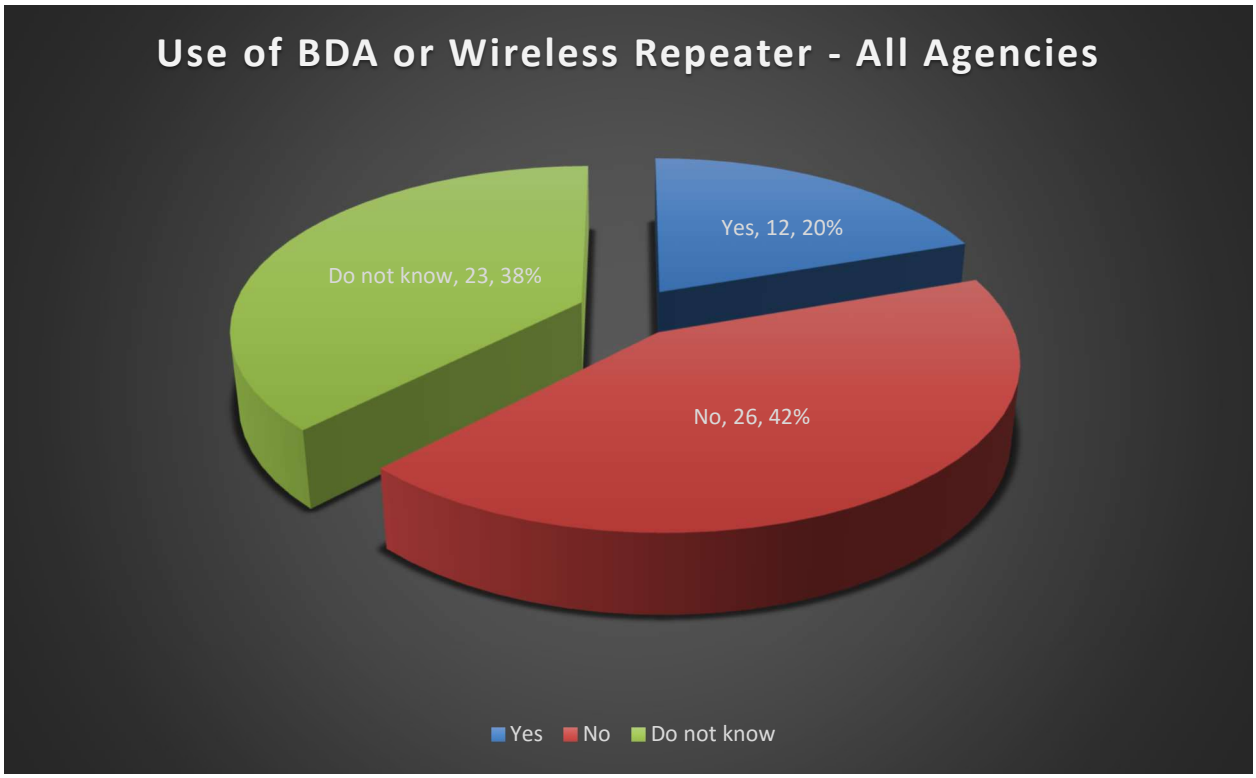




3.3.8. Bi-Directional Amplifiers

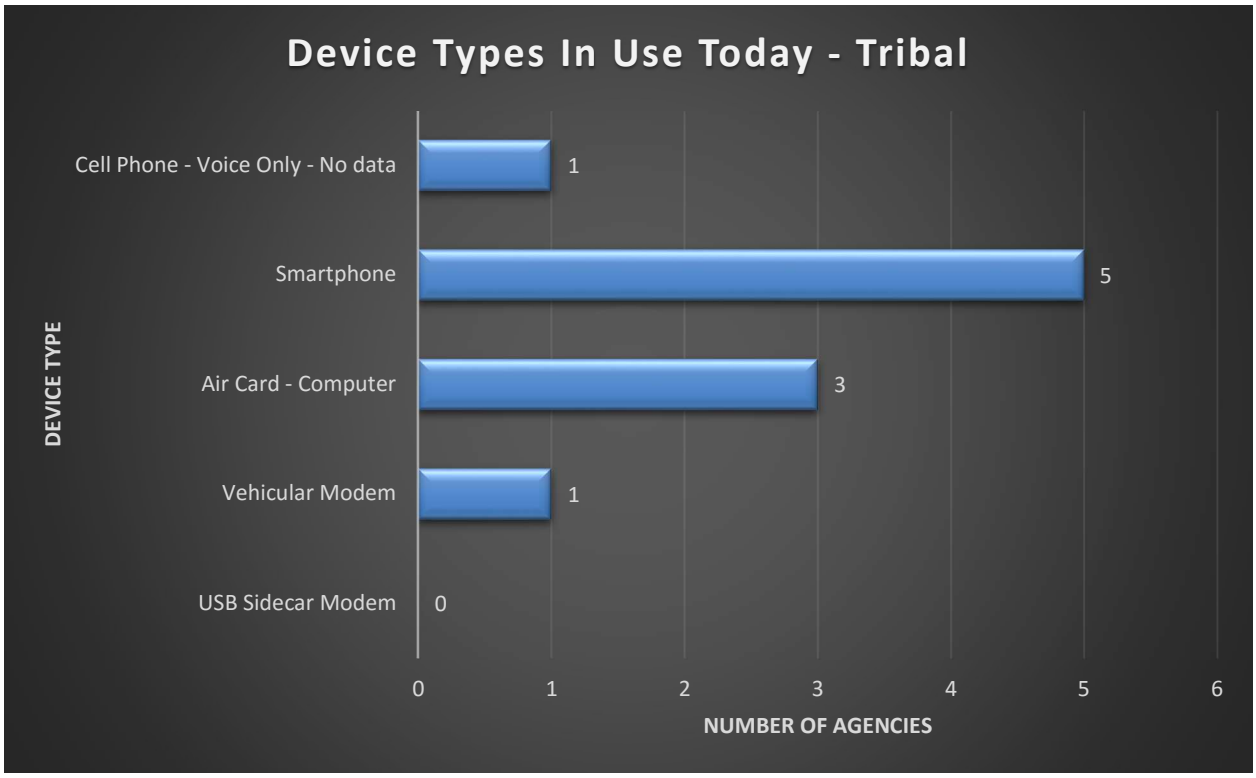
The following charts indicate whether agencies currently utilize bi-directional amplifiers or wireless repeaters:

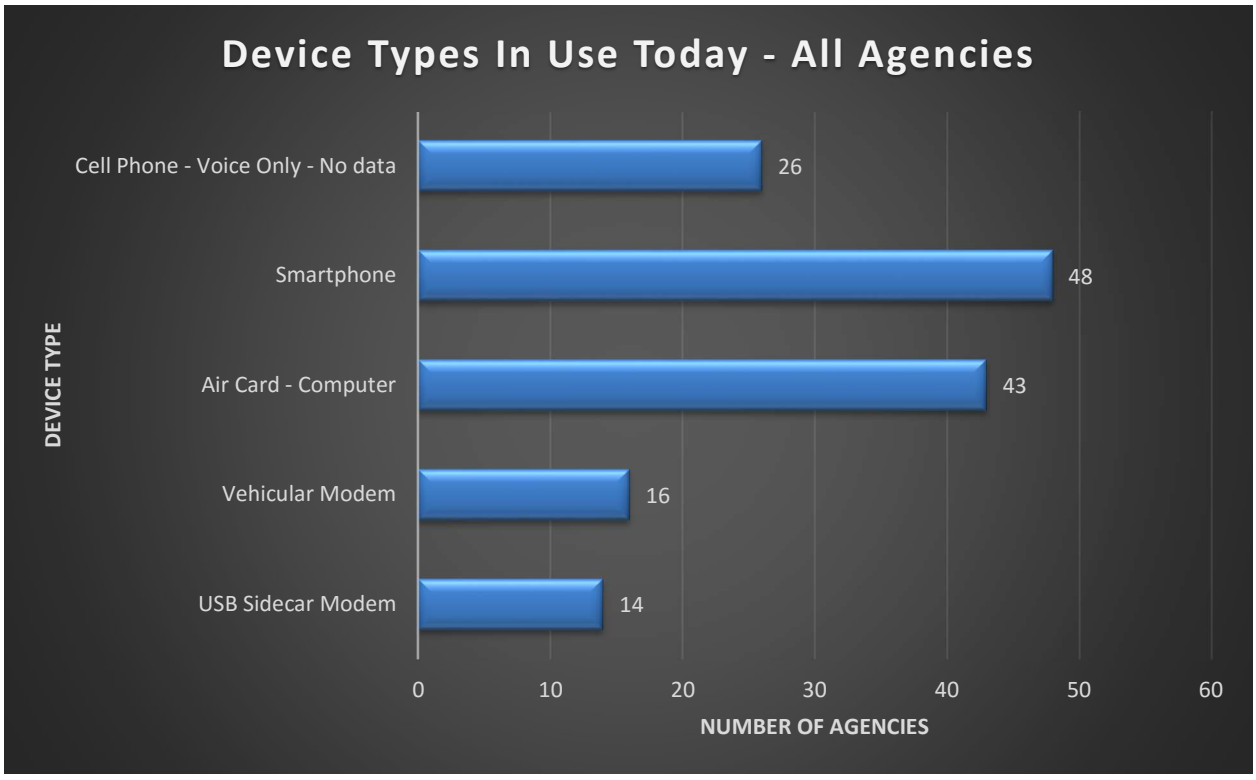




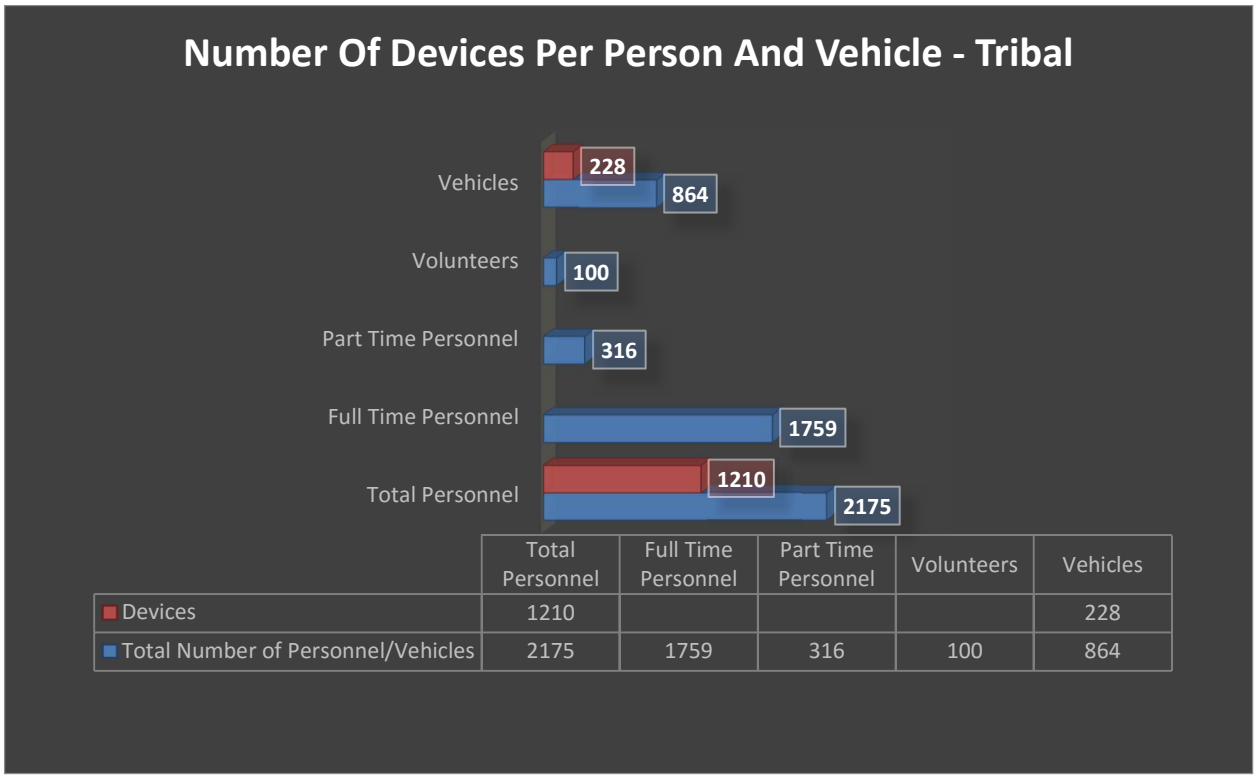
3.3.9. Broadband Devices

The following charts depict the types of broadband devices deployed today by agencies responding to the surveys:

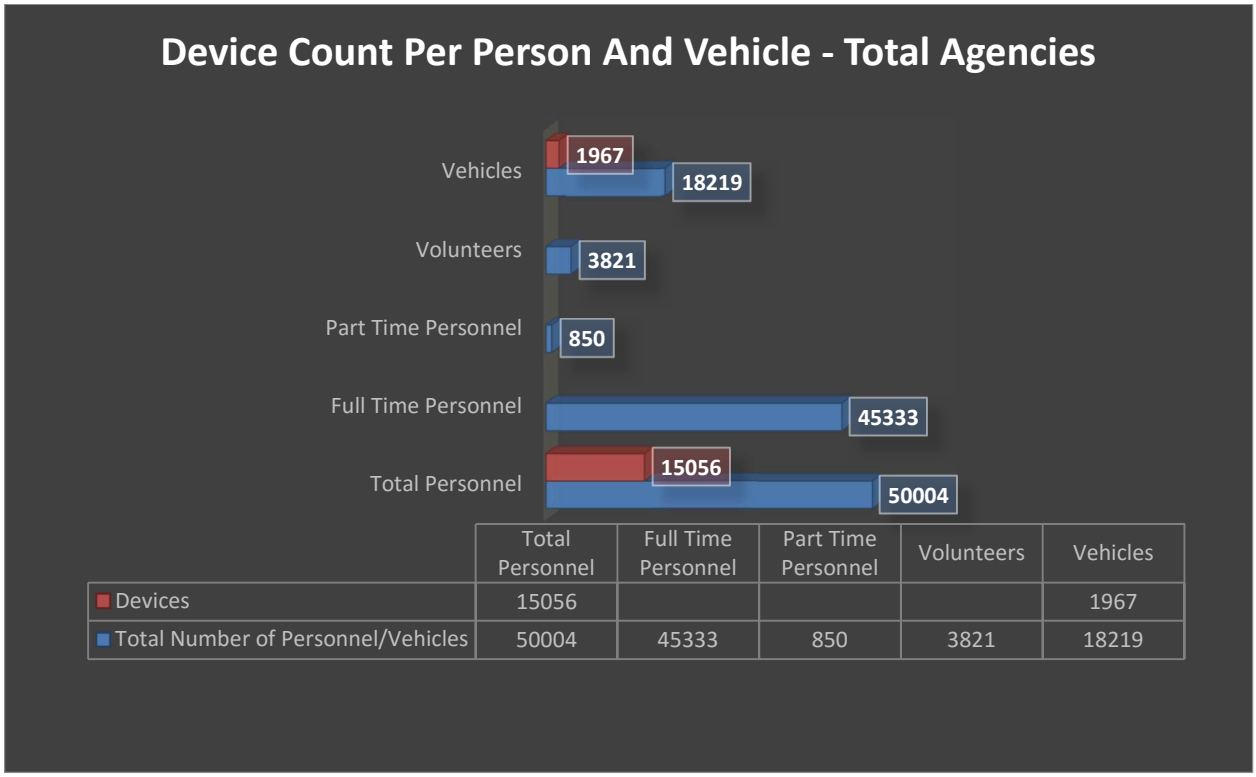




The survey respondents reported a total of 50,004 employees within their agencies, and a total of 18,219 vehicles. They reported having issued a total of 15,056 devices to personnel, and 1,967 devices to vehicles.



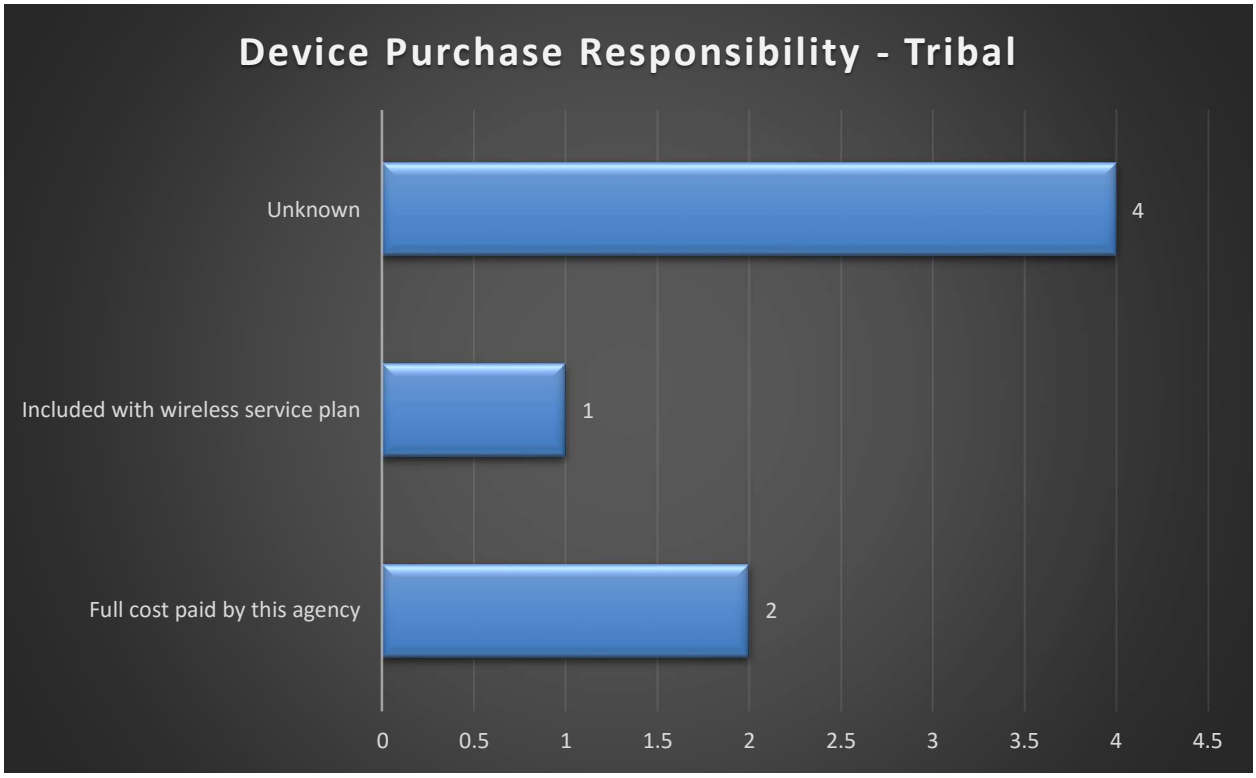
	Total Personnel	Full Time Personnel	Part Time Personnel	Volunteers	Vehicles
Devices	1210				228
Total Number of Personnel/Vehicles	2175	1759	316	100	864

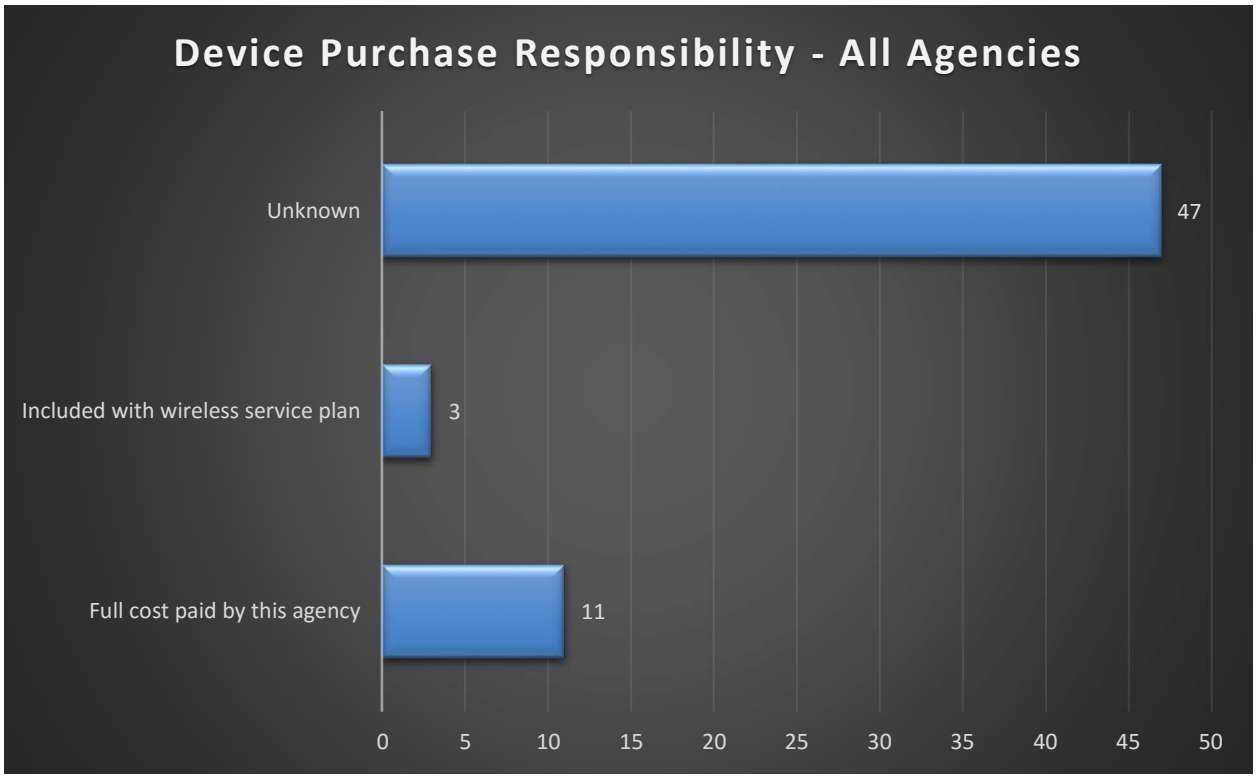


	Total Personnel	Full Time Personnel	Part Time Personnel	Volunteers	Vehicles
Devices	15056				1967
Total Number of Personnel/Vehicles	50004	45333	850	3821	18219

3.3.10. Device Purchase Responsibility

The following charts reflect who assumes responsibility for initial purchasing of devices:



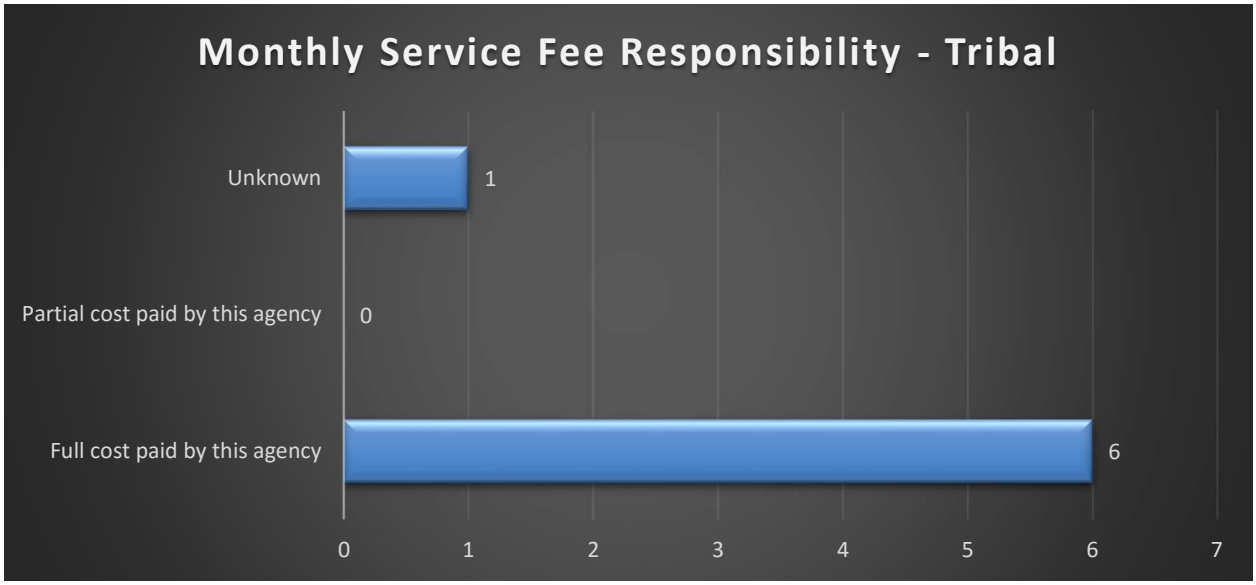


3.4. INITIAL PURCHASE PRICE

The median price for the initial purchase of devices was reported at $200.00. The mean initial purchase price for devices was reported at $988.00. FirstNet would need to meet a price point somewhere between those two prices in all likelihood, to be competitive.

3.4.1. Monthly Service Fee Responsibility

The following charts depict who assumes responsibility for payment of current monthly fees for wireless data services:

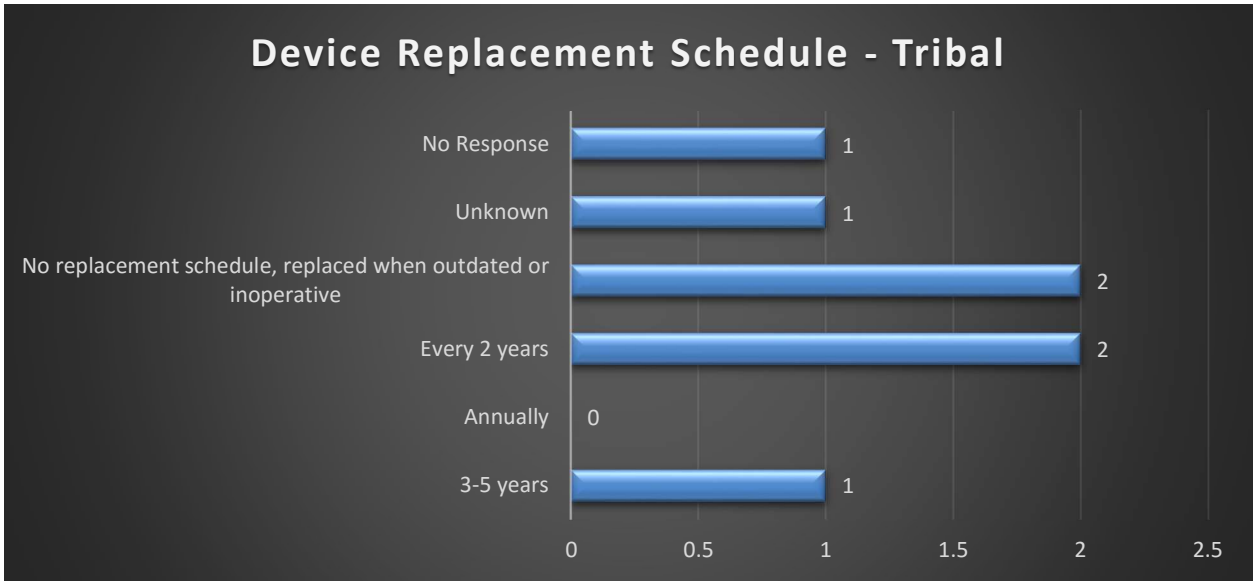


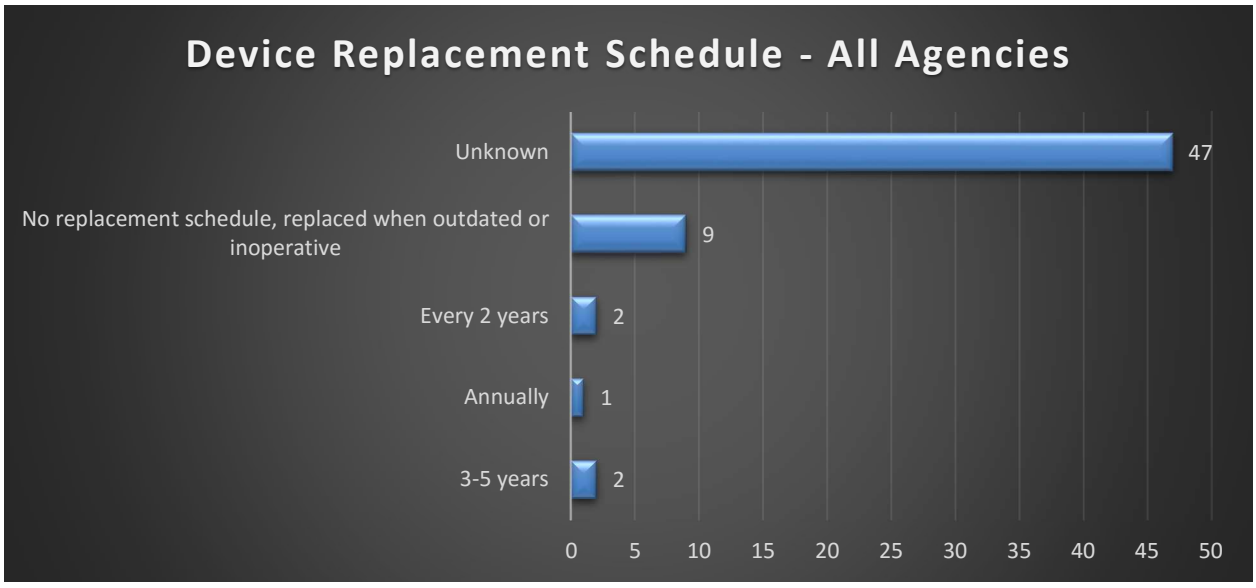
3.4.2. Monthly Costs Per Device

The median monthly cost of wireless service per device as reported by all agencies was $40.00. The mean monthly cost per device was $140.00. A couple of agencies reported unusually high monthly wireless service costs per month, so the median cost is deemed to be much more indicative of the monthly price point with which FirstNet will have to be competitive upon NPSBN deployment.

3.4.3. Device Replacement Schedule

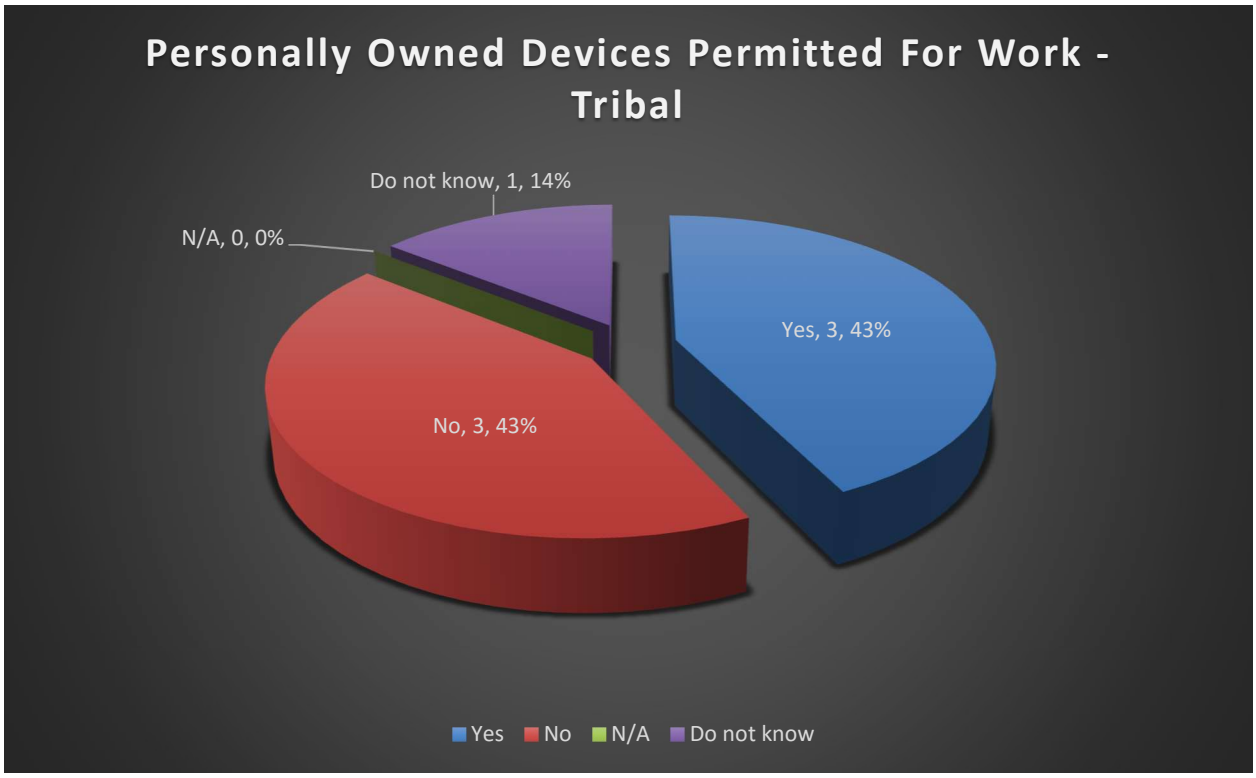
The charts below depict device replacement schedules as reported by responding agencies:

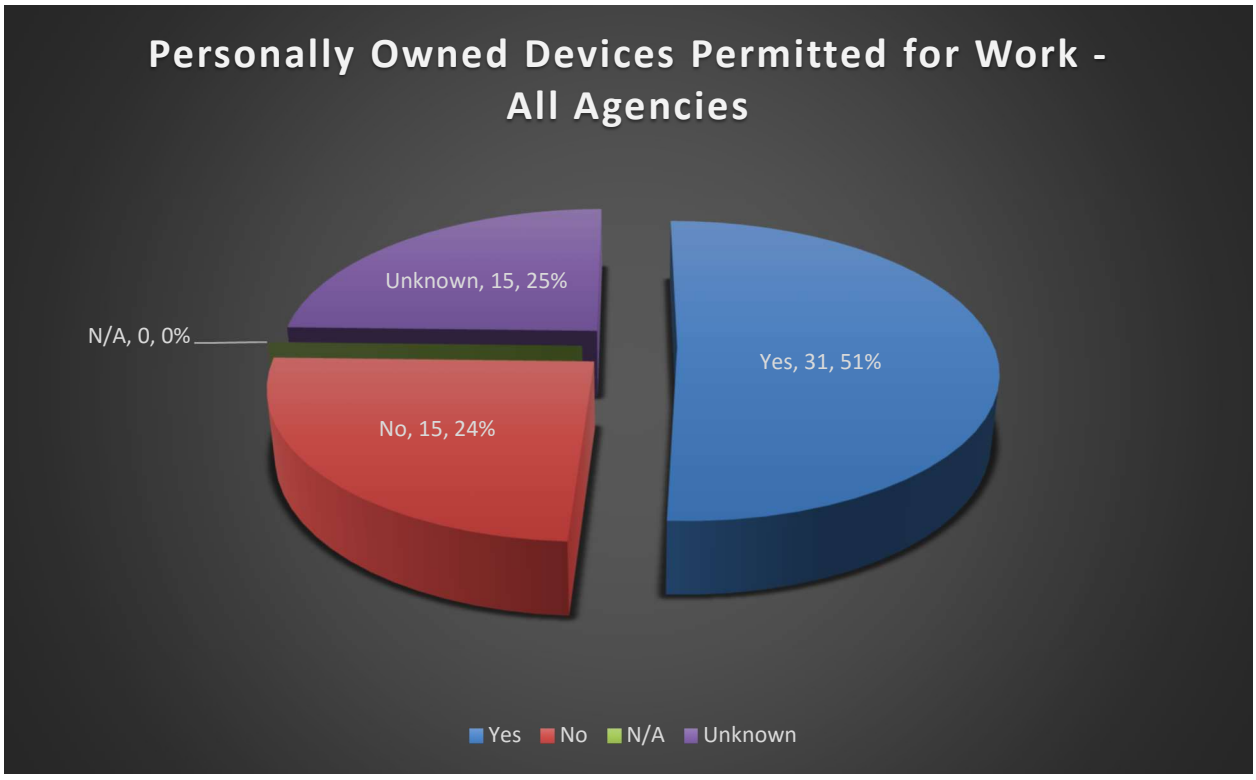


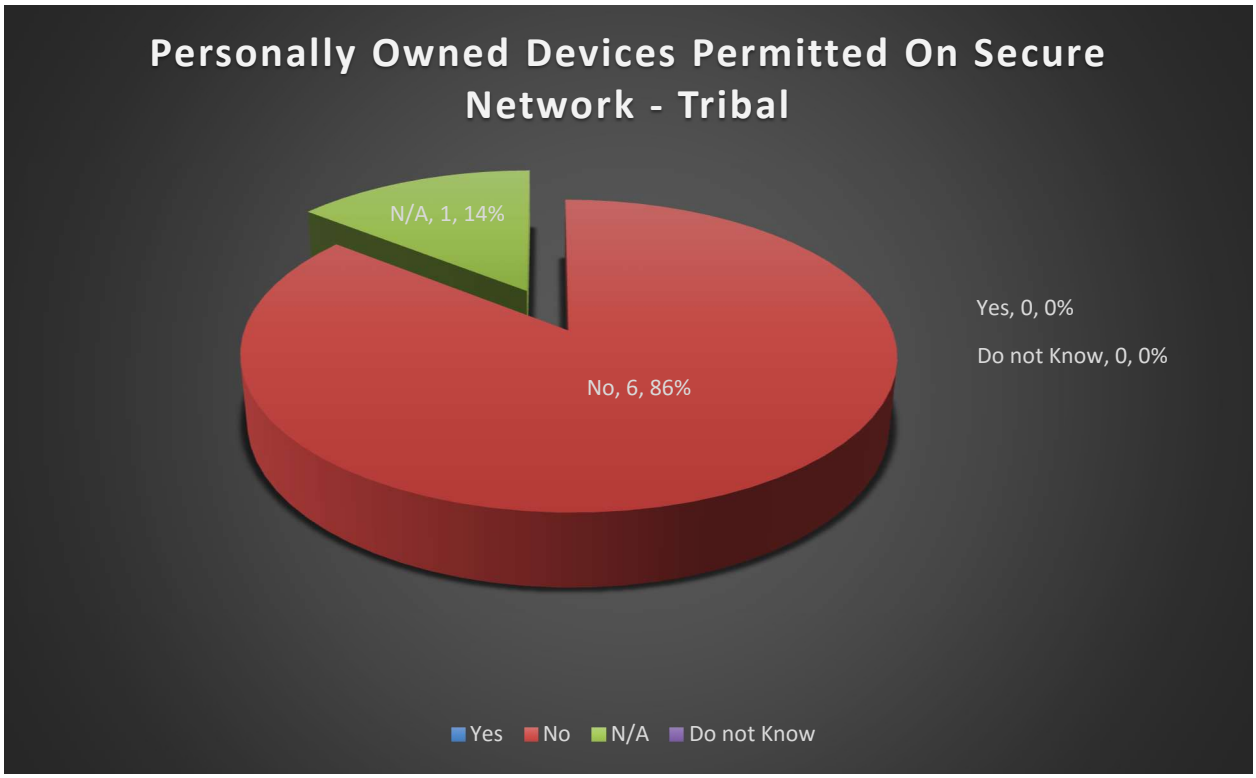


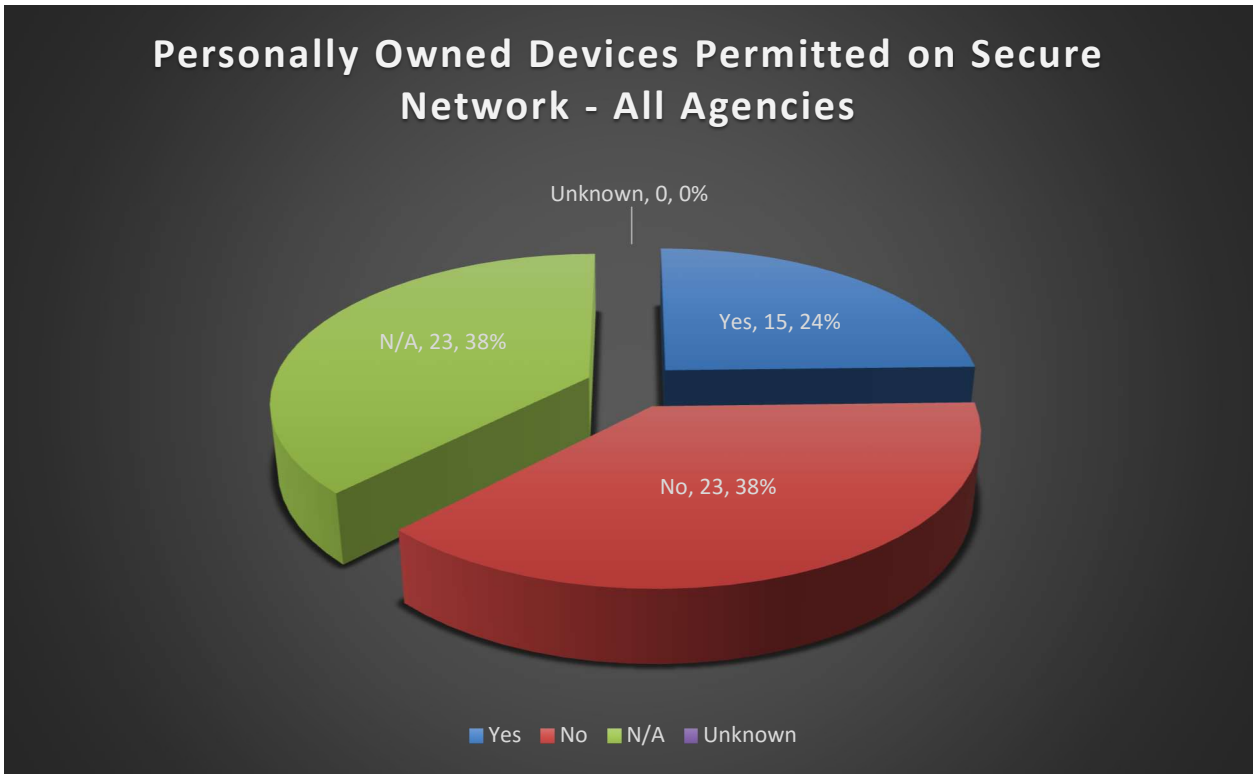
3.4.4. Personally Owned Devices

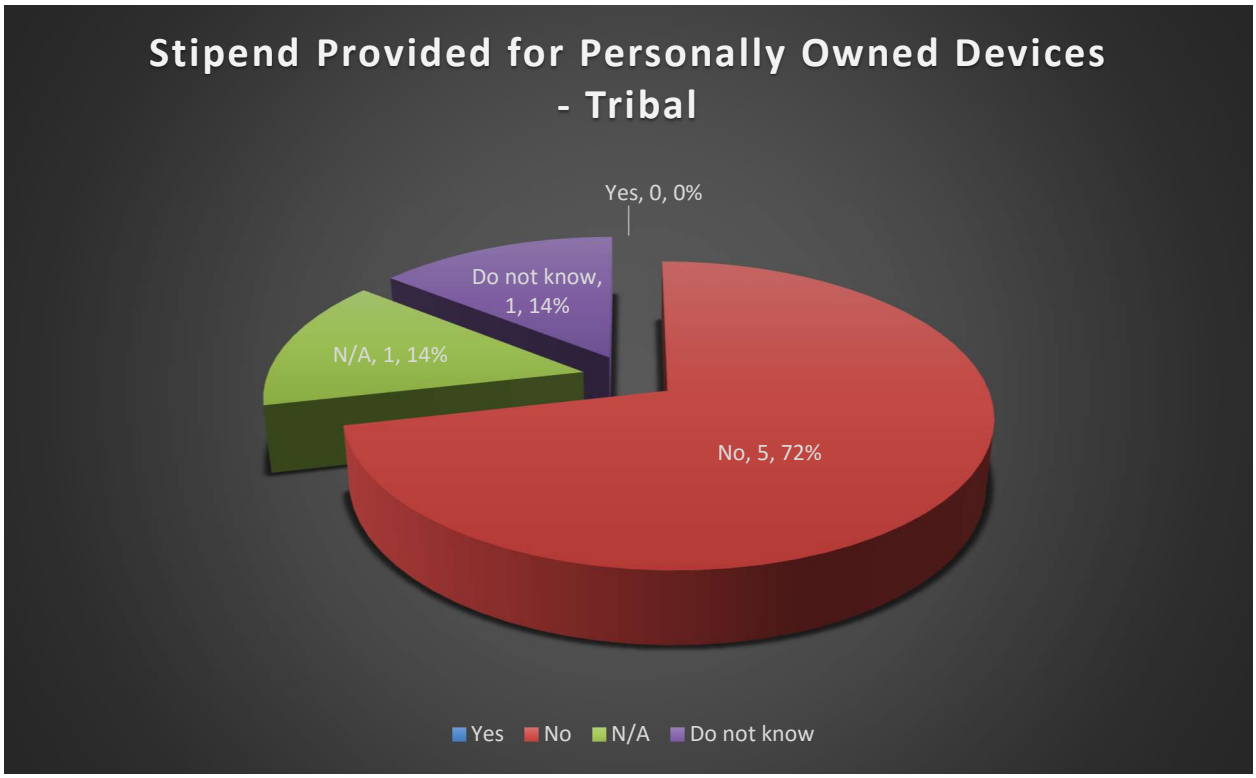
The following charts depict personally owned device usage information:

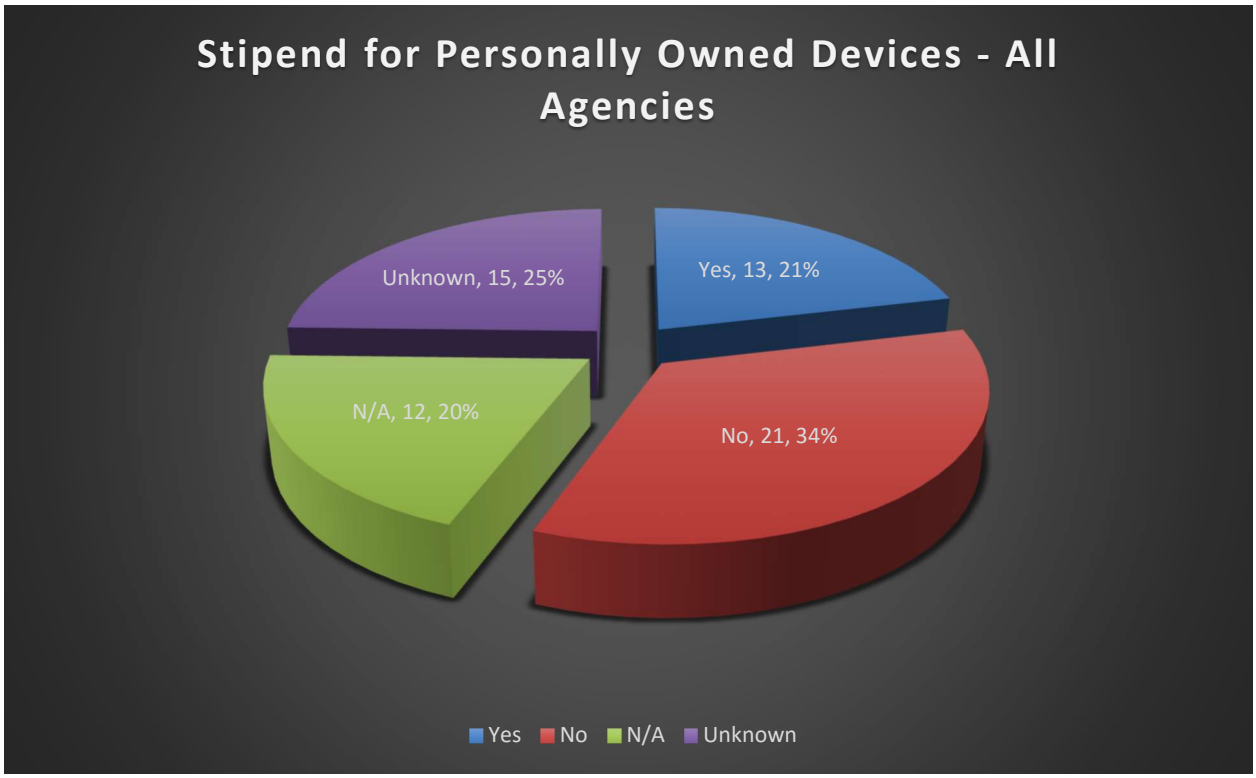





Personally Owned Devices Permitted On Secure Network - Tribal
N/A, 1, 14%
No, 6, 86%
Yes, 0, 0%
Do not Know, 0, 0%
Yes
No
N/A
Do not Know


Personally Owned Devices Permitted on Secure Network - All Agencies
Unknown, 0, 0%
Yes, 15, 24%
N/A, 23, 38%
No, 23, 38%
Yes
No
N/A
Unknown



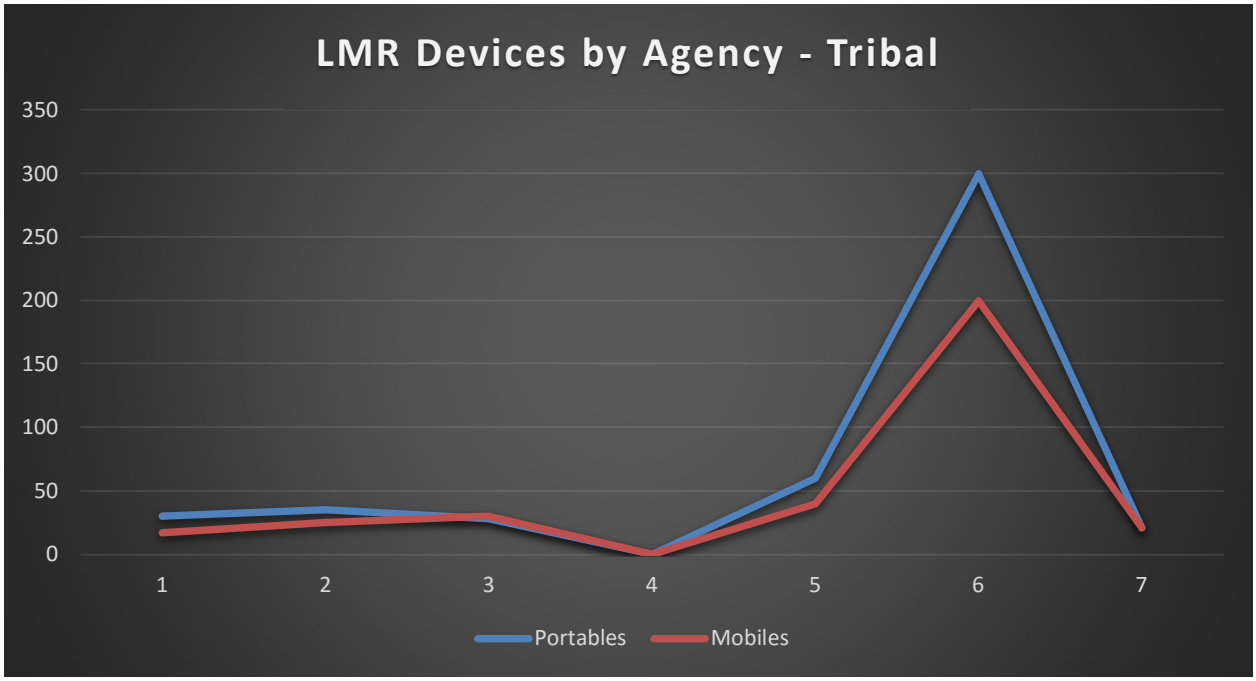


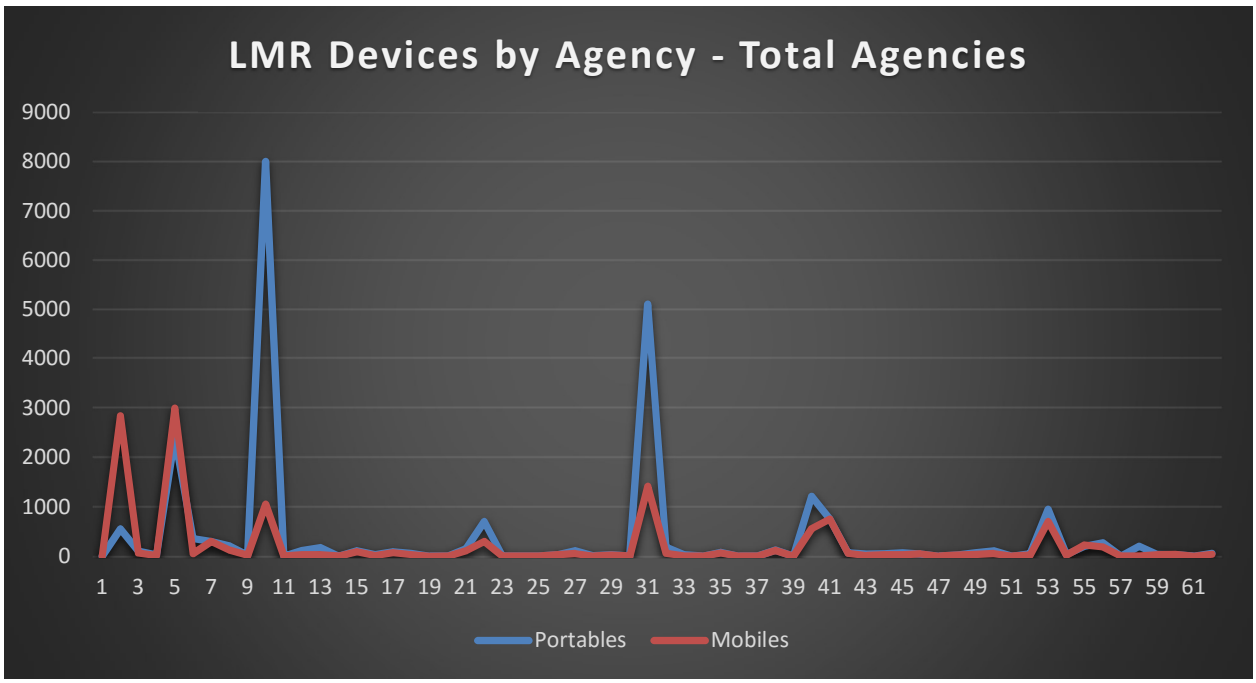
The device data received indicates that many of the agencies surveyed do not provide agency-issued devices. Given that a significant percentage of agencies allow personnel to use their own devices for work purposes (according to the survey responses), but the majority of agencies do not currently provide broadband devices for their users, solutions must be developed to allow personal devices to access

applications on the FirstNet network. Further, it should be noted that, regardless of the capabilities provided by FirstNet, there are underlying funding limitations for most agencies that prohibit them from issuing broadband devices.

3.4.5. LMR Devices

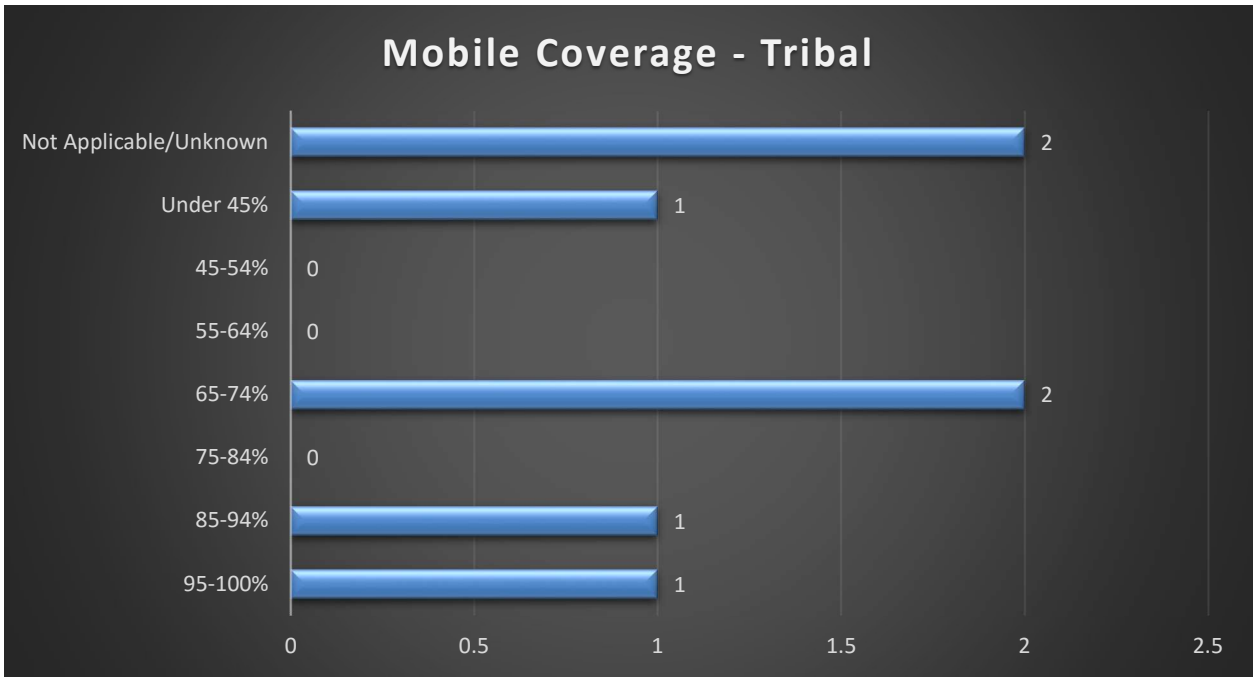
The charts below represent the number of LMR devices currently deployed by agencies responding to the surveys. Each number on the horizontal axis of the chart represents an agency, and the numbers on the vertical axis represent the number of devices.

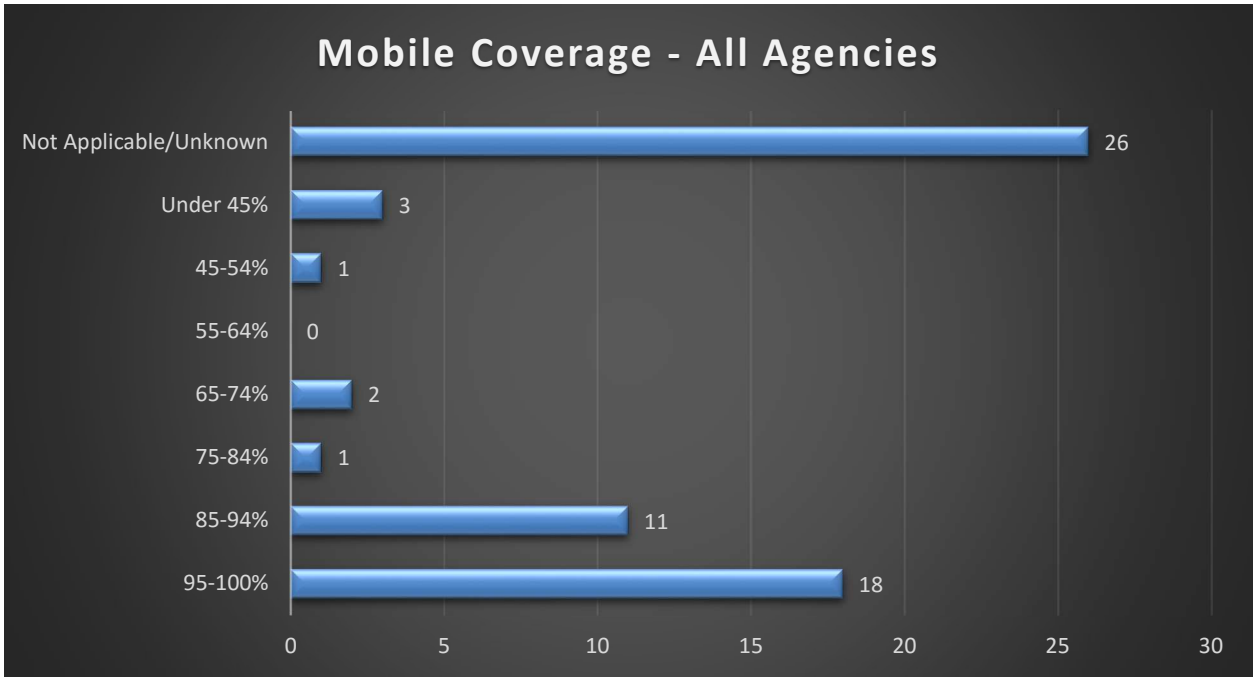


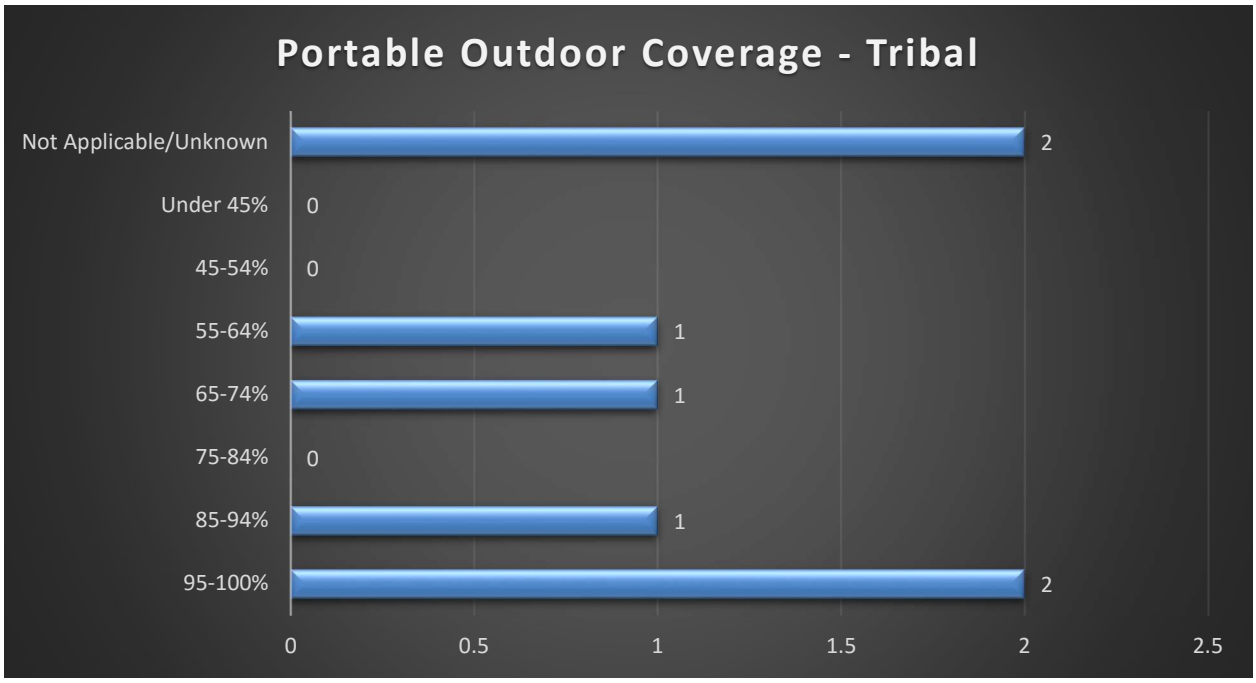


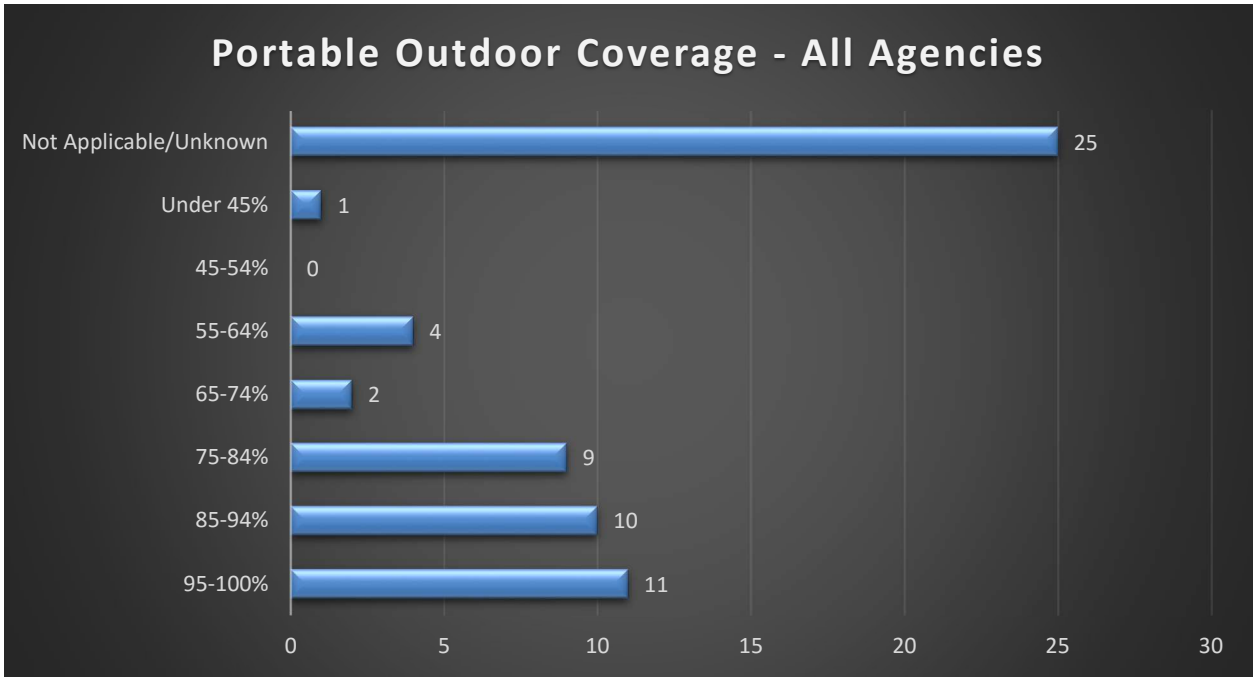
3.4.6. Current LMR Coverage Levels

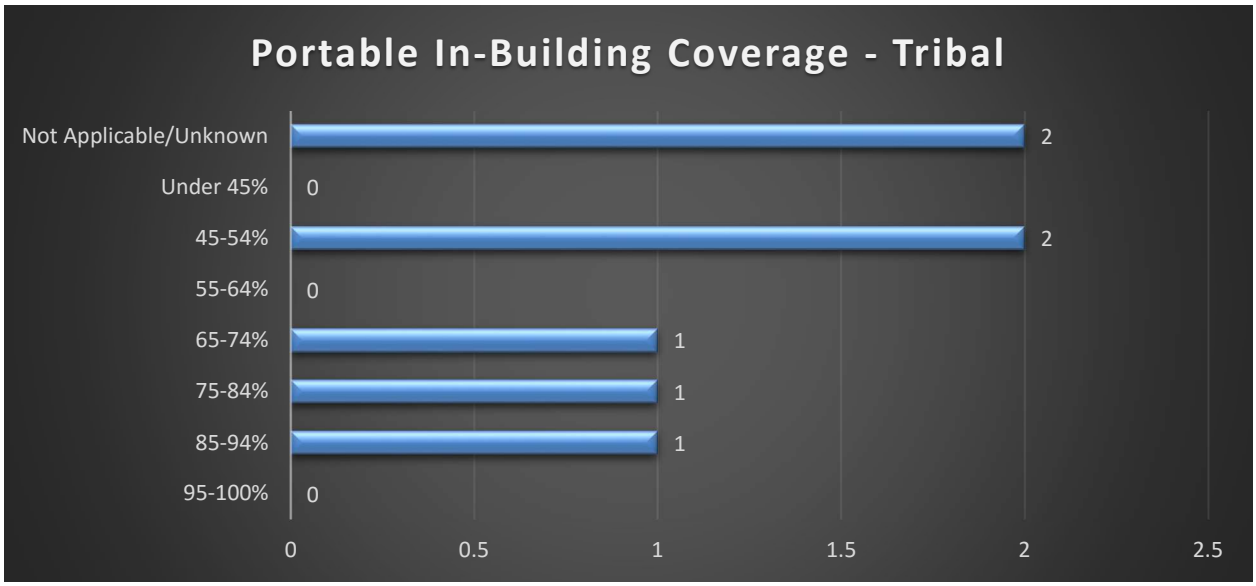
Respondents were asked to report the current level of coverage on their LMR system for mobile, portable outdoor, and portable indoor usage. The following charts depict those results:

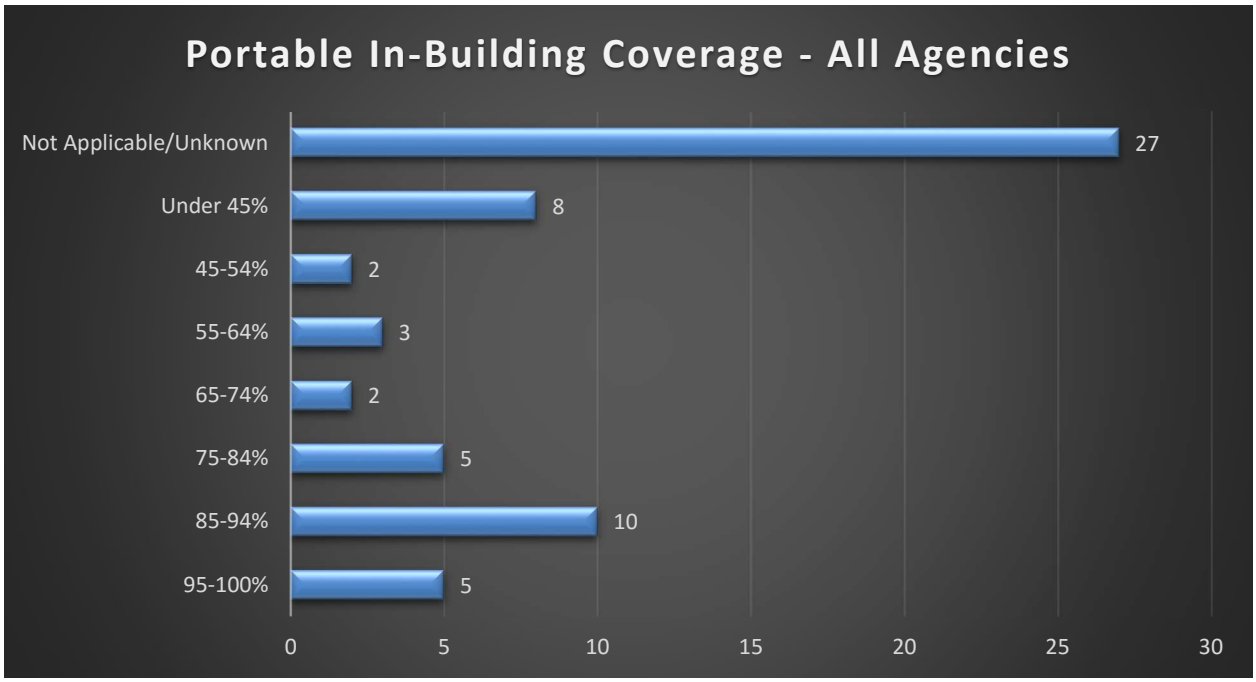





Portable Outdoor Coverage - Tribal
Not Applicable/Unknown
Under 45%
45-54%
55-64%
65-74%
75-84%
85-94%
95-100%
2
0
0
1
1
0
1
2
0
0.5
1
1.5
2
2.5

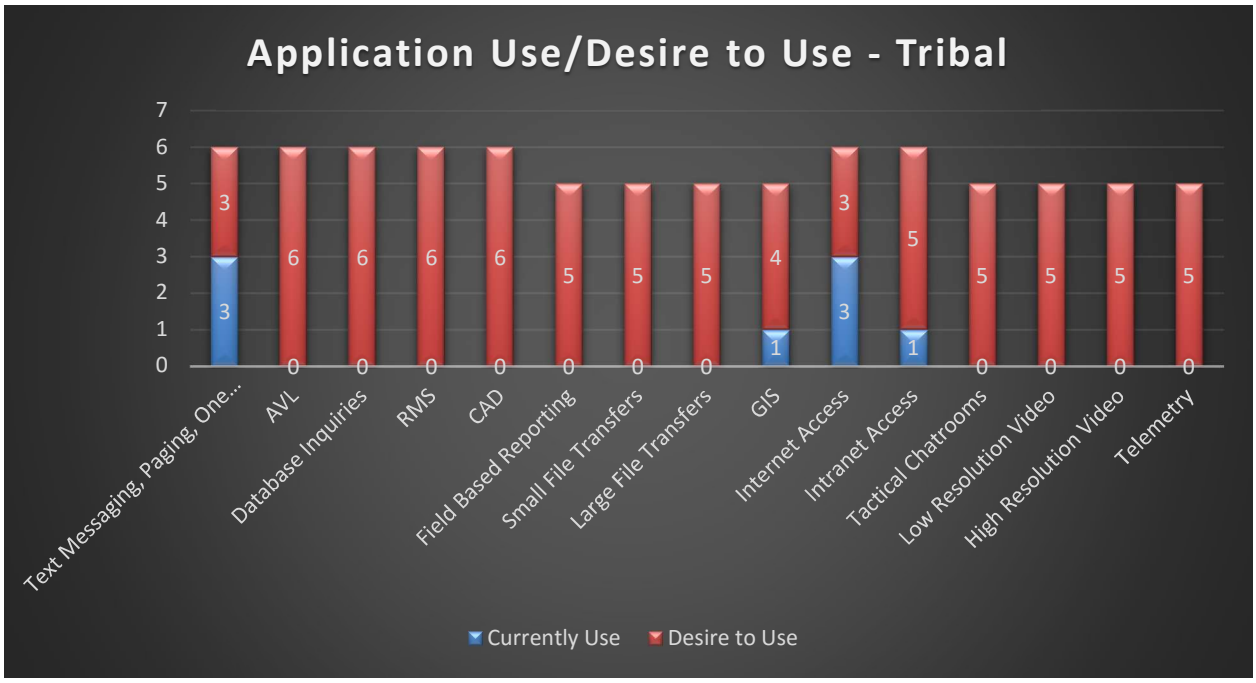

Portable Outdoor Coverage - All Agencies
Not Applicable/Unknown
Under 45%
45-54%
55-64%
65-74%
75-84%
85-94%
95-100%
25
1
0
4
2
9
10
11
0
5
10
15
20
25
30

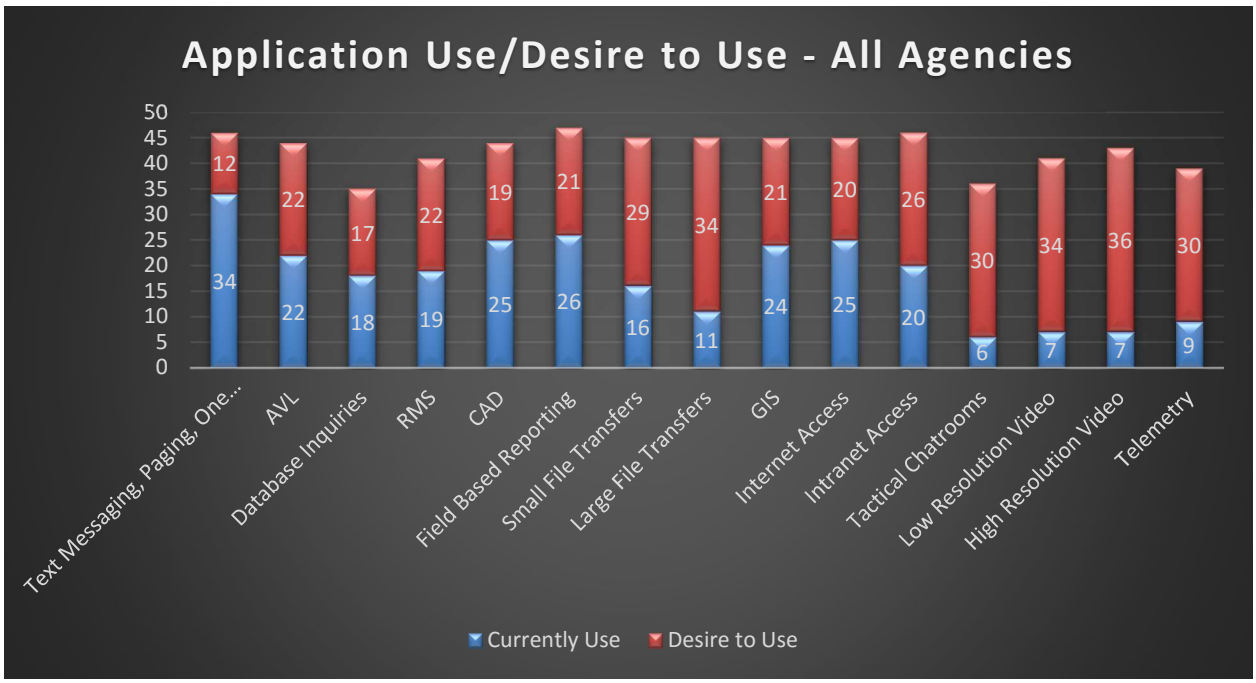




3.4.7. Data Applications

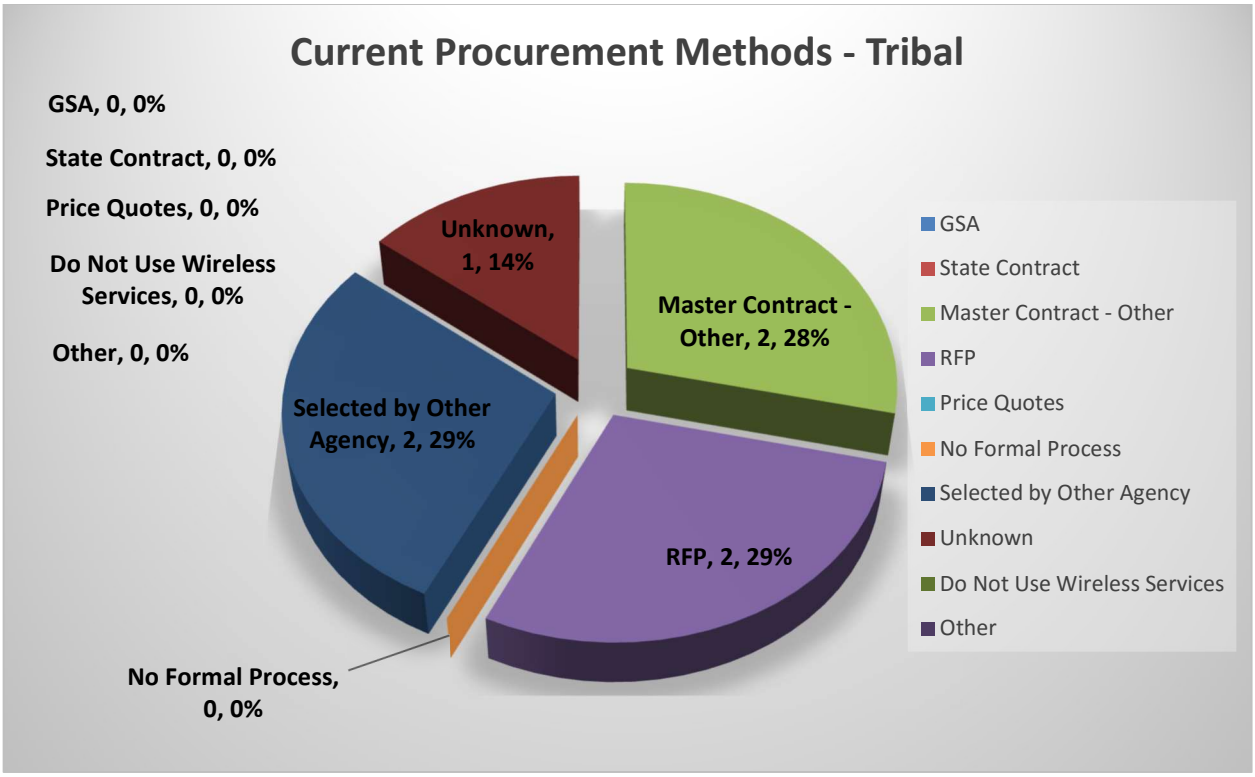
Agencies were asked to provide information concerning their current application usage as it relates to text messaging/paging, automatic vehicle location (AVL), computer-aided dispatch (CAD), database inquiries, Internet access, Intranet access, records management systems (RMS), tactical chatrooms, video, GIS, and telemetry. The graphs below summarize the reported results for each application as to whether an agency currently used the application, or would desire to use it in the future.

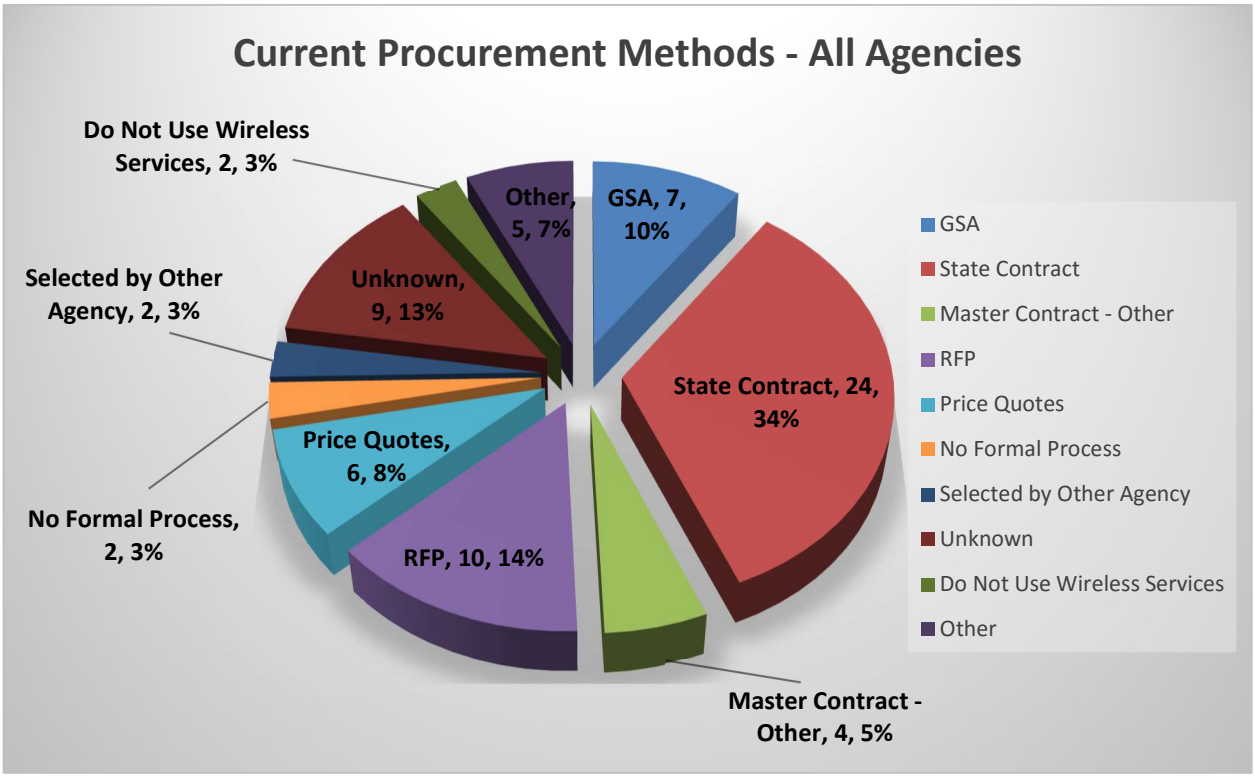

Application Use/Desire to Use - Tribal
7
6
5
4
3
2
1
0
3
3
6
0
6
0
6
0
6
0
5
0
5
0
5
0
4
1
3
3
5
1
5
0
5
0
5
0
5
0
Text Messaging, Paging, One...
AVL
Database Inquiries
RMS
CAD
Field Based Reporting
Small File Transfers
Large File Transfers
GIS
Internet Access
Intranet Access
Tactical Chatrooms
Low Resolution Video
High Resolution Video
Telemetry
Currently Use
Desire to Use


Application Use/Desire to Use - All Agencies
50
45
40
35
30
25
20
15
10
5
0
12
34
22
22
17
18
22
19
19
25
21
26
29
16
34
11
21
24
20
25
26
20
30
6
34
7
36
7
30
9
Text Messaging, Paging, One...
AVL
Database Inquiries
RMS
CAD
Field Based Reporting
Small File Transfers
Large File Transfers
GIS
Internet Access
Intranet Access
Tactical Chatrooms
Low Resolution Video
High Resolution Video
Telemetry
Currently Use
Desire to Use

3.5. CURRENT PROCUREMENT

Agencies currently procure their services through a variety of methods. Approximately one-third of the responding agencies utilize the State's master contract.

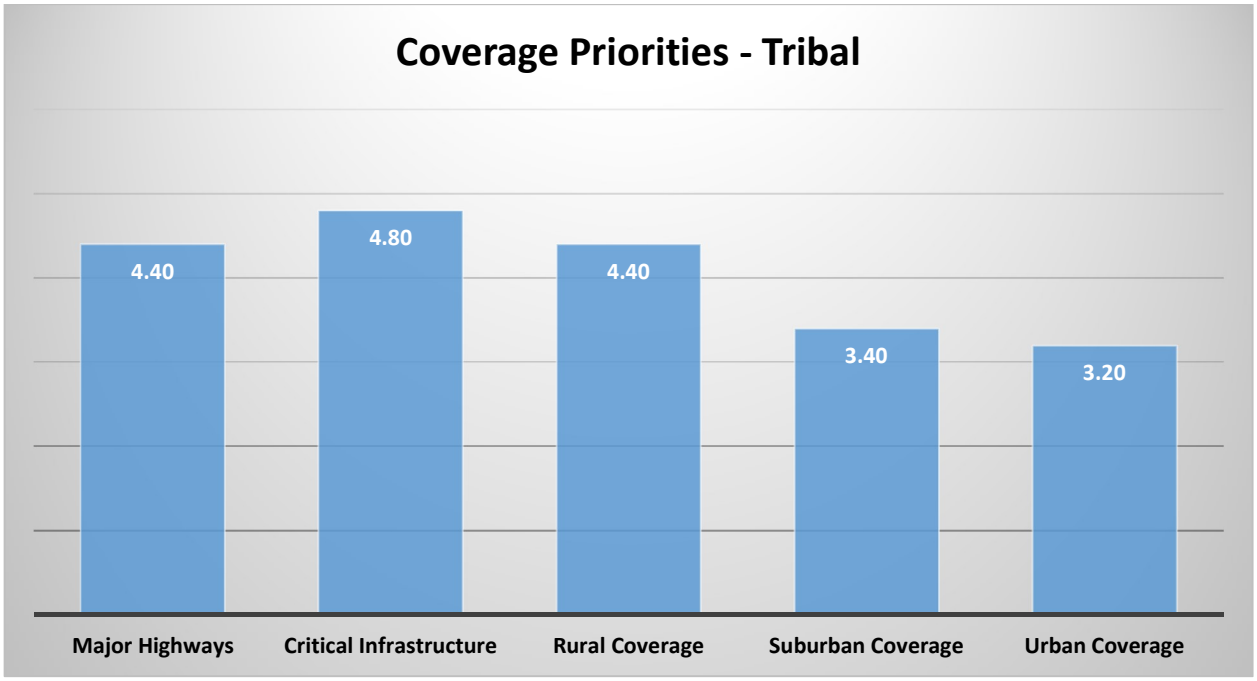


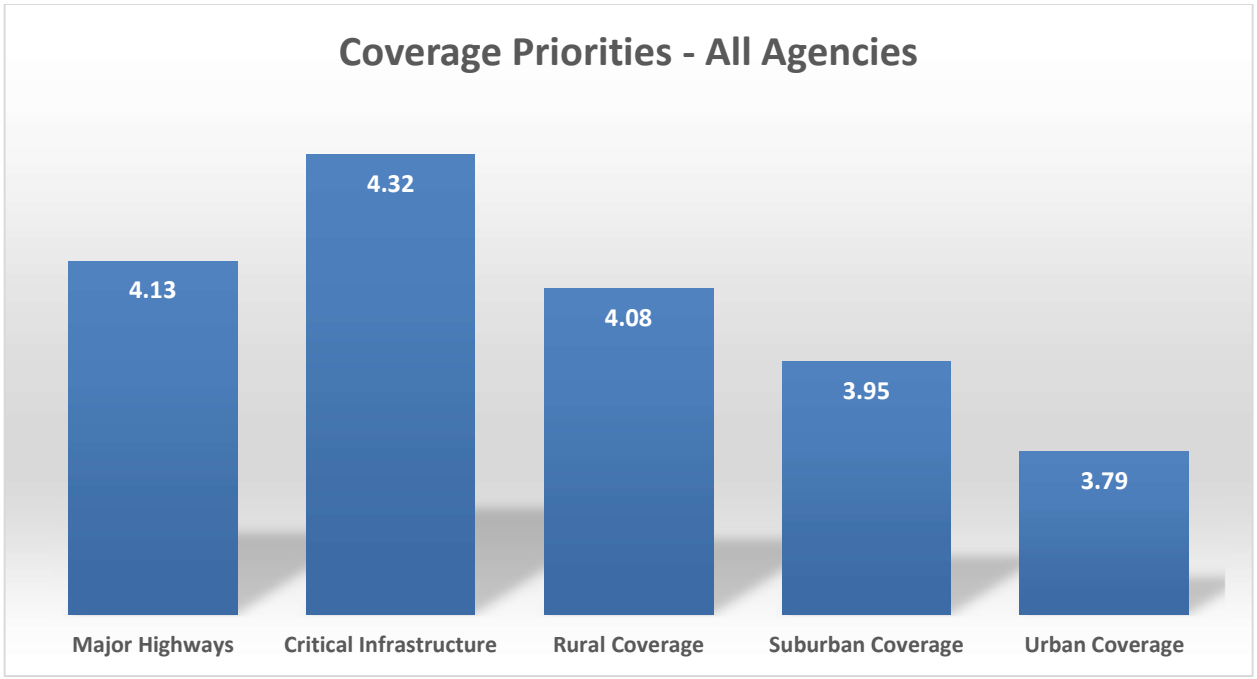


3.6. PHASED DEPLOYMENT

3.6.1. Coverage Priorities

Survey respondents were asked to prioritize network coverage areas on a scale of 1 to 5, with 1 being the lowest priority and 5 being the highest priority. The categories ranked were Major Highways, Critical Infrastructure, Rural Areas, Suburban Areas, and Urban Areas. The charts below reflect the aggregated results of the priority rankings:





3.6.2. Phased Deployment Plan

Arizona submitted a proposed phased deployment plan with its 2015 data submission. The plan is being re-submitted below, but has not changed from the 2015 submission. Phase 1 would cover the most populated areas of the state, as well as the most visited tourist areas of the Grand Canyon and the town of Sedona.

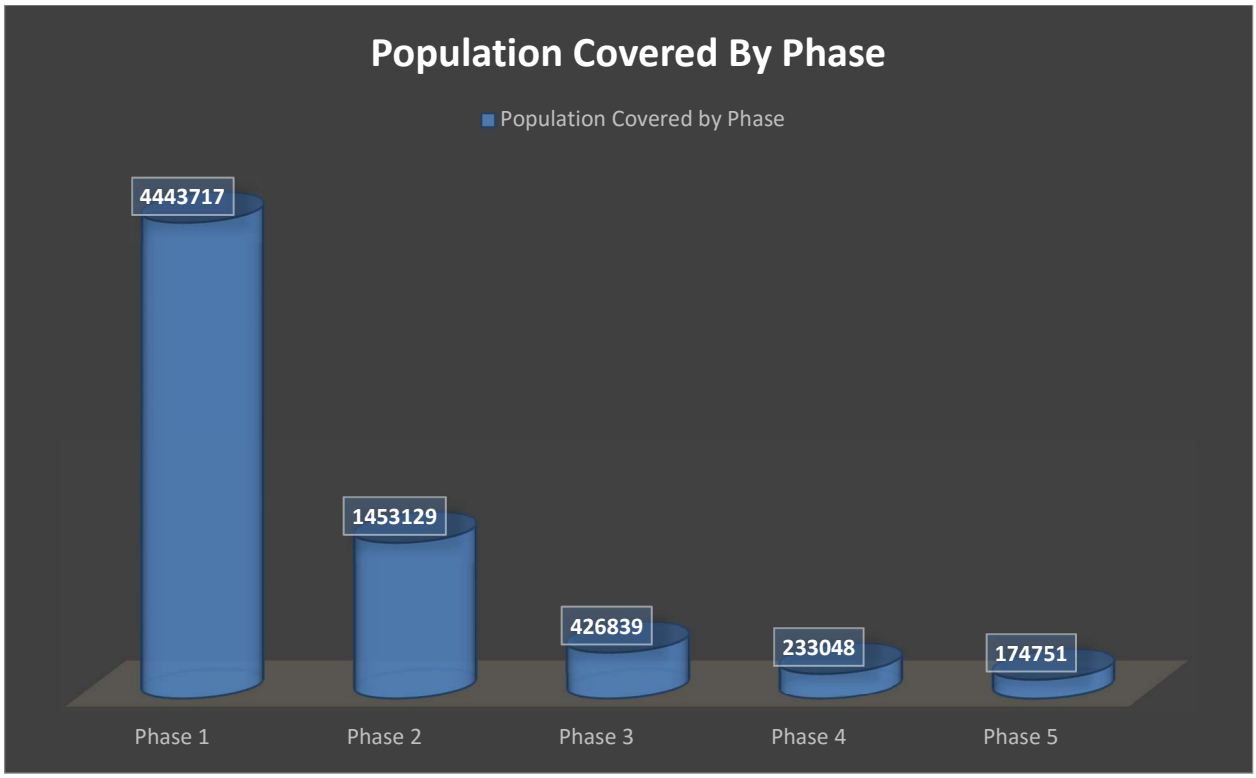
PHASE 1	Population
Maricopa County	4,087,191
Yavapai County	218,844
Coconino County	137,682
TOTAL	4,443,717

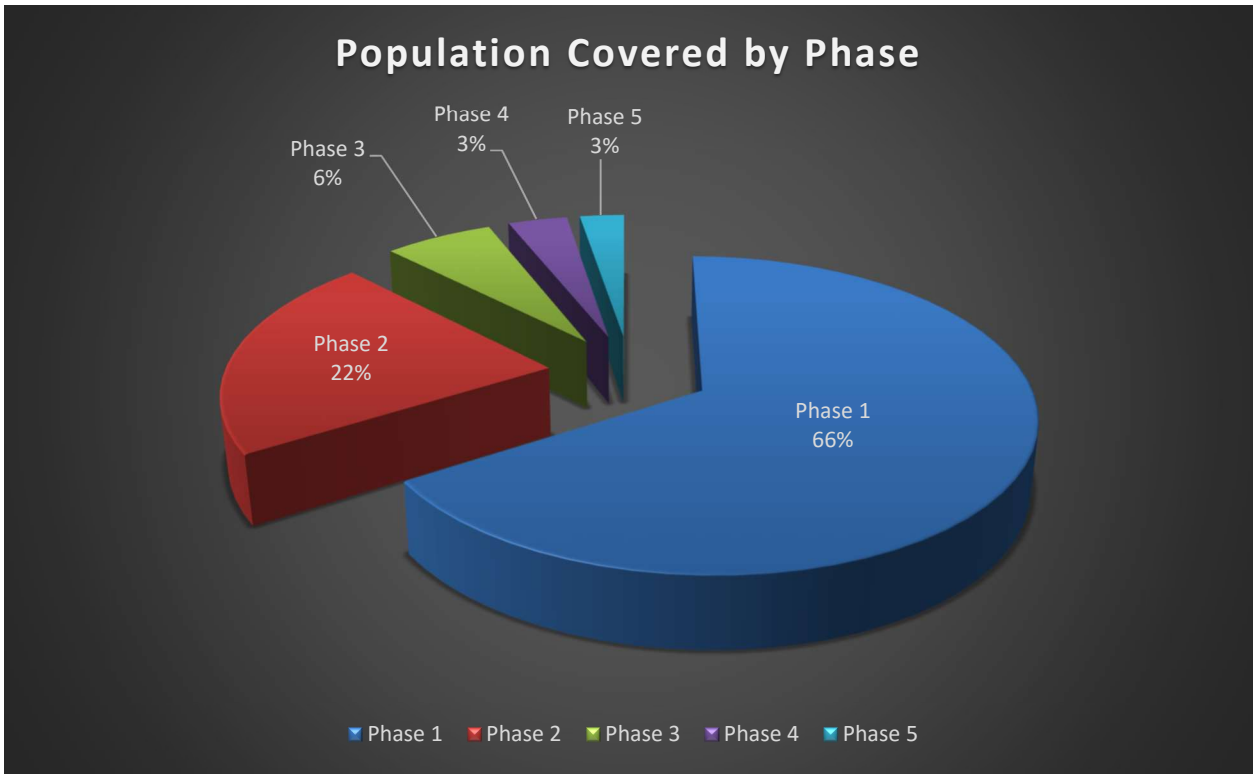
PHASE 2	Population
Pima County	1,004,516
Pinal County	401,918
Santa Cruz County	46,695
TOTAL	1,453,129

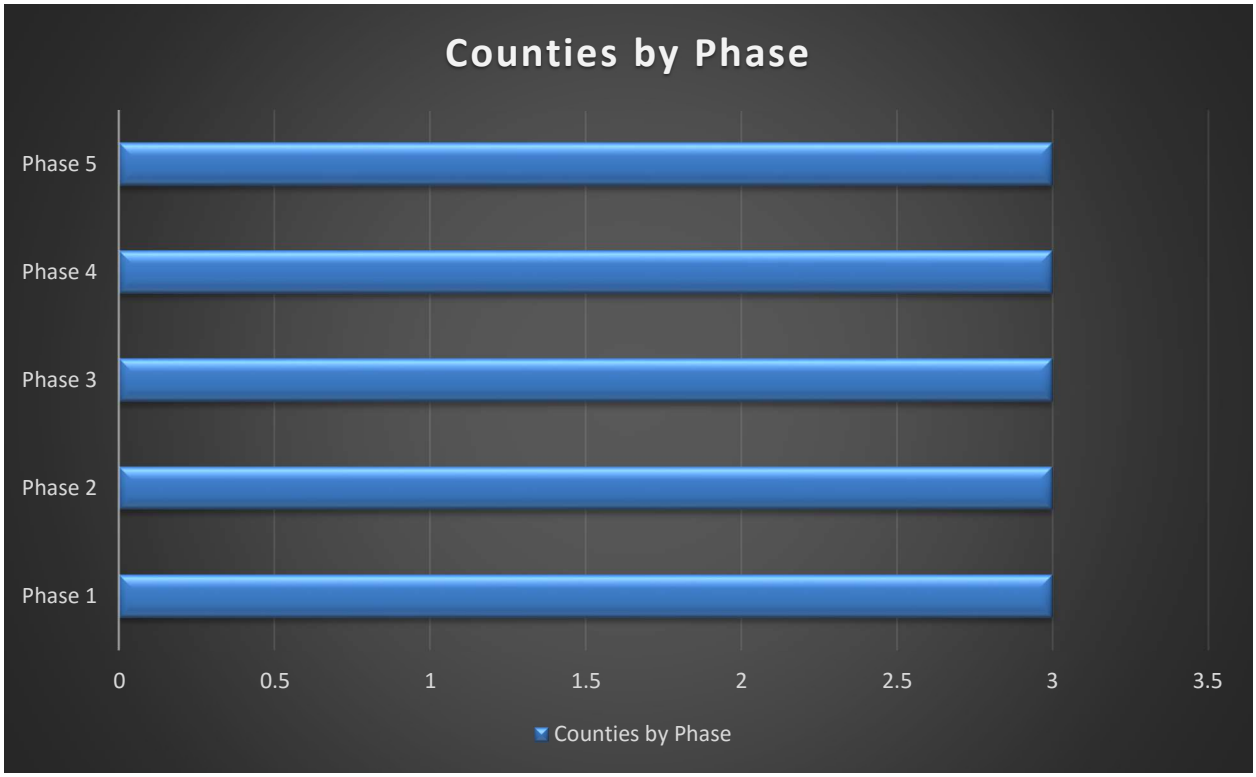
PHASE 3	Population
Yuma County	203,247
La Paz County	20,231
Mohave County	203,361
TOTAL	426,839

PHASE 4	Population
Apache County	71,828
Navajo County	108,101
Gila County	53,119
TOTAL	233,048

PHASE 5	Population
Cochise County	127,448
Greenlee County	9,346
Graham County	37,957
TOTAL	174,751




Population Covered by Phase
Phase 4
3%
Phase 5
3%
Phase 3
6%
Phase 2
22%
Phase 1
66%
Phase 1
Phase 2
Phase 3
Phase 4
Phase 5


Counties by Phase
Phase 5
Phase 4
Phase 3
Phase 2
Phase 1
0
0.5
1
1.5
2
2.5
3
3.5
Counties by Phase

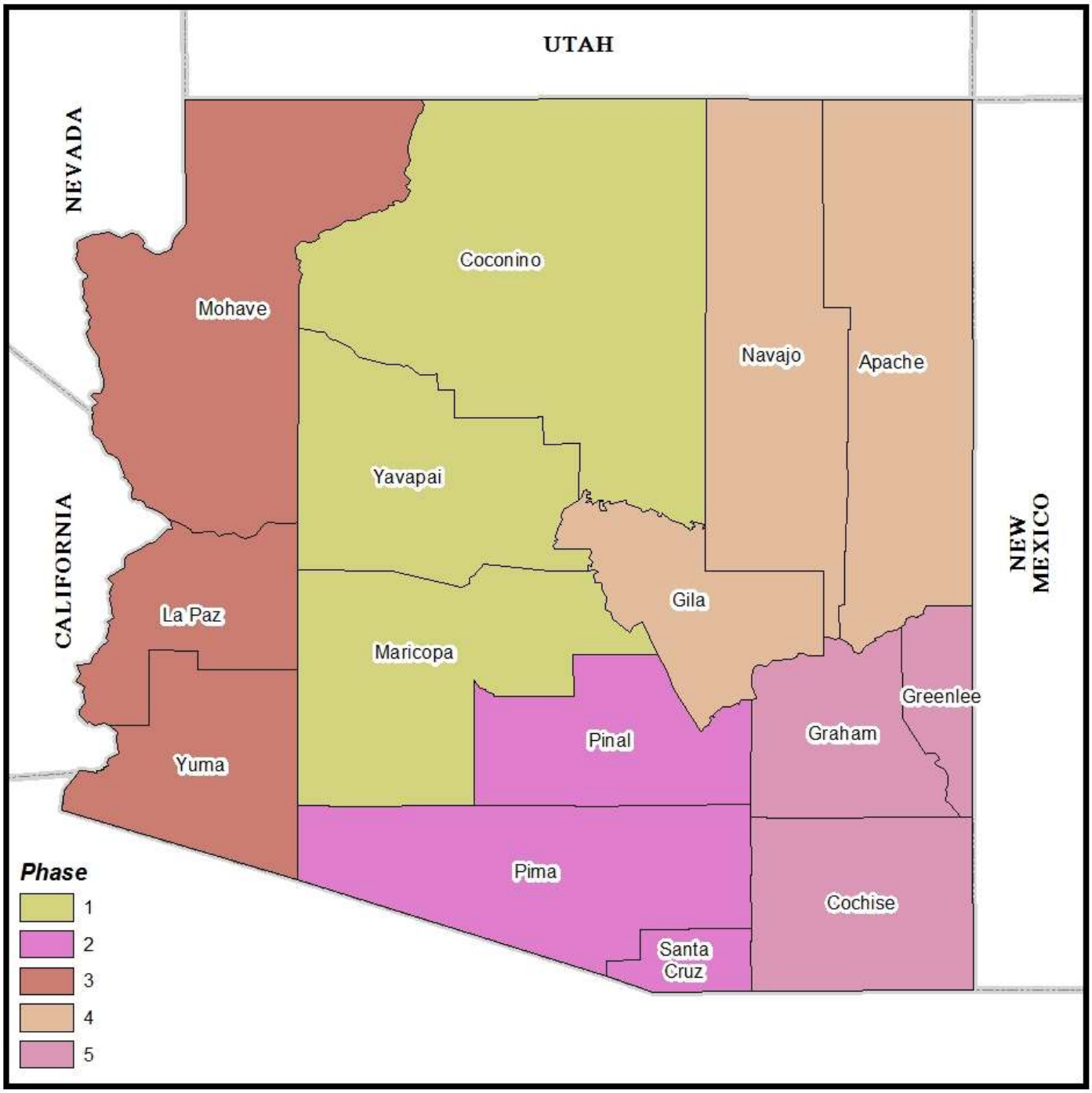
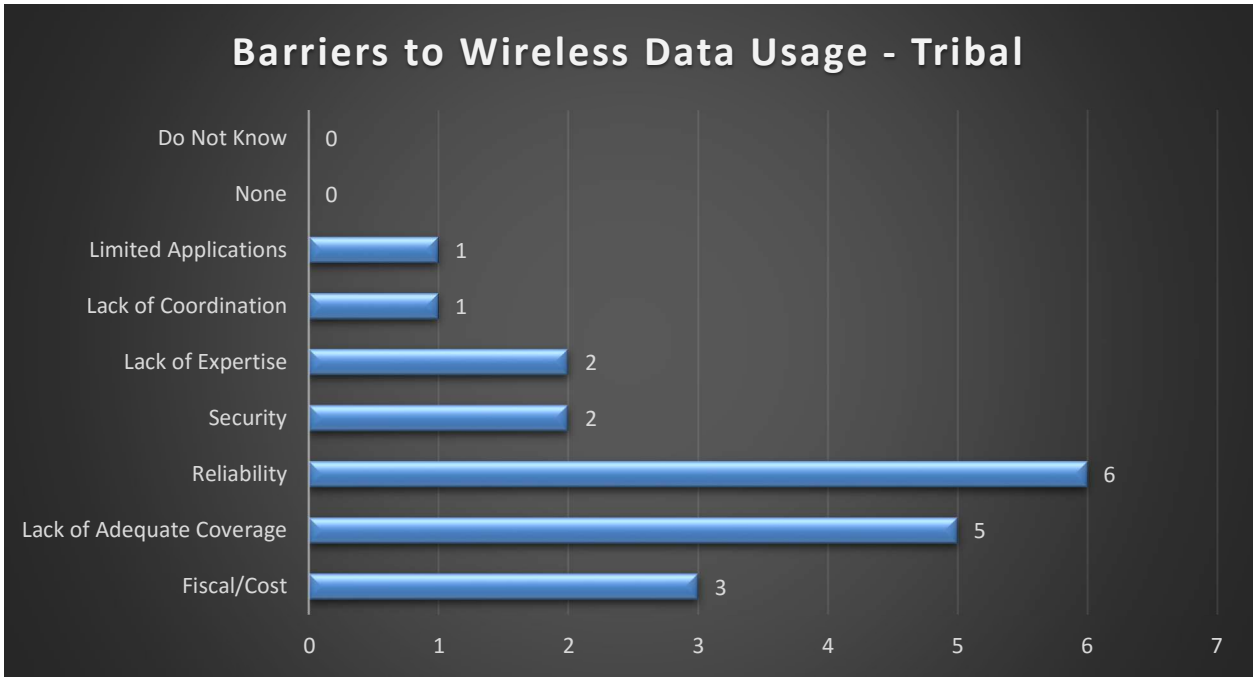
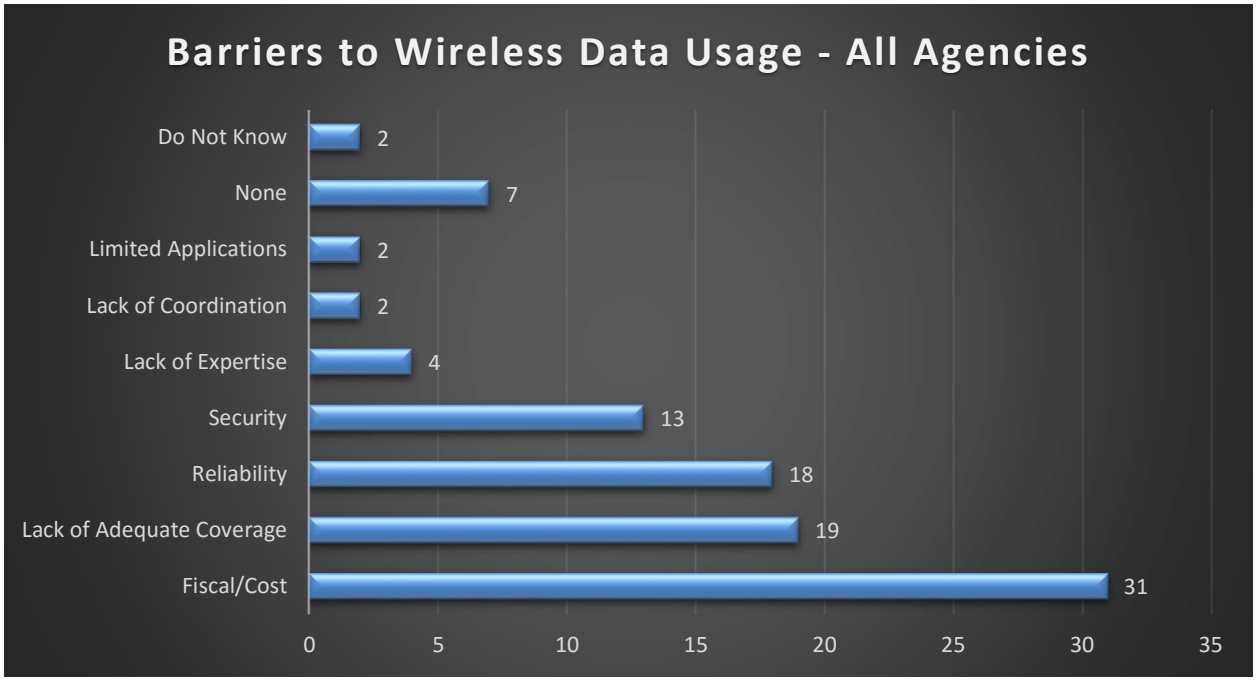


Figure 51: Arizona Phased Deployment

3.7. BARRIERS

Agencies were asked to identify the current barriers that exist today that would prevent them from utilizing wireless technology to its fullest extent. Agencies were permitted to identify multiple barriers. The charts below depict the responses. As can be seen, cost and coverage are the most significant barriers to agencies for utilizing wireless technology, although reliability and coverage also are seen by most agencies to be obstacles.





4. RECOMMENDATIONS

The State has collected a substantial amount of data pertaining to the level to which FirstNet's NPSBN must be built to meet user requirements and promote adoption. Based on the data collected, the State has developed recommendations for FirstNet regarding how it feels FirstNet should interpret this data. The following sections detail the State's recommendations for each of the primary data-collection categories.

4.1. COVERAGE OBJECTIVES

The State received several submissions from local agencies depicting areas that pose a high risk to public safety and as such should be considered for coverage. The State is very concerned about the baseline coverage model furnished by FirstNet, in that it appears a vast majority of State land will not receive network coverage, including a very large portion of Tribal lands. This data submission clearly illustrates the need for coverage across the state beyond what FirstNet is contemplating. Specifically, the Grand Canyon in Coconino County, which receives more than 2 million visitors annually, and the southwestern border with Mexico, are both tremendous public safety risk areas that are situated in very rural areas.

The State has considerable land area that would be classified as "frontier"; however, discussions need to be conducted as to providing coverage in some of these areas. The State does experience times when frontier wildfires are a significant issue, and NPSBN coverage to those high-risk areas needs to be considered, as there currently is no commercial service provided there.

The State has collected data elements for GIS mapping. The GIS files for the map have been provided with this submission.

4.2. USERS AND OPERATIONAL AREAS

Considerable data was collected pertaining to current users and operational areas, along with the current number of devices deployed. The reported ratio of devices deployed per person was only 0.3, i.e., the survey represented approximately 50,000 personnel issued approximately 15,000 devices. This ratio, however, in all likelihood is skewed by two factors: not all personnel are currently issued agency devices; and lack of current commercial coverage in many areas prohibits the use of wireless data services. FirstNet needs to recognize that as agencies adopt the NPSBN, the number of deployed devices can be expected to be 1-1.5 per person based on current commercial estimates. This is especially true if network policies allow for a "bring your own device" (BYOD) provision.

4.3. CAPACITY OBJECTIVES

Arizona's most densely populated area would be the greater Phoenix metropolitan area in Maricopa County, which includes the cities of Mesa, Tempe, Scottsdale, Glendale, Chandler, and Gilbert. The other significant population center would be the greater Tucson metropolitan area in Pima County. Sufficient capacity planning for these areas is imperative given the number of people, responders, and significant events that occur there.

As far as current and desired application usage, the results of the MDST survey described above indicate that the most desired application is video, which is also the most bandwidth-intensive application. This will need to be taken into consideration for capacity-planning purposes within the State.

4.4. CURRENT PROCUREMENT

The survey found that most agencies utilize a master contract or a bid/request for proposals (RFP) process for procuring their current services. FirstNet will need to ensure that its services are included in the current master contract procurement vehicles, and also that its services are priced very competitively in comparison with current commercial offerings.

4.5. PHASED DEPLOYMENT

The State has submitted a proposed phased deployment plan, which has not changed since the 2015 data submission. It is largely based on population and the most popular tourist areas, with Phase 1 covering the Phoenix, Sedona, and Grand Canyon areas. The rest of the phases follow through the remaining population bases.

4.6. BARRIERS

Information collected concerning current barriers revealed cost, coverage, and reliability are the most significant barriers to adoption at the present time. It can be anticipated that these are the metrics by which the FirstNet offering will be judged, with FirstNet needing to be at least as good, if not better than, current commercial offerings in those areas.

Appendix 1 – All Agencies

Arizona Department of Transportation – Infrastructure Deliver and Operations Division	Nogales Police Department
Arizona Department of Transportation – Traffic Operations Center	North County Fire & Medical District
Apache Junction Police Department	Northern Arizona University Police Department
Arizona Ambulance Transport	Oro Valley Police Department
Arizona Department of Public Safety	Peoria Police Department
Arizona Game And Fish Department	Phoenix Police Department
Avondale Police Department	Pima County Sheriff's Department
Avra Valley Fire District	Pinal County
Arizona Department of Corrections	Prescott Valley Police Department
Arizona Department of Economic Security	Queen Valley Fire District
Arizona Department of Emergency and Military Affairs	Rio Rico Medical And Fire District
Arizona Department of Corrections	Scottsdale Police Department
Black Canyon Fire District	Sedona Police Department
Buckeye Police Department	Show Low Police Department
Buckskin Fire Department	Sierra Vista Police Department
Bullhead City Police Department	St. Johns Emergency Services
Casa Grande Fire Department	Superstition Fire and Medical District
City of Douglas Fire Department	The University of Arizona
City of Goodyear	Timbermesa Fire And Medical District
City of Mesa	Tubac Fire District
City of Phoenix Aviation Department	Tucson Fire Department
City of Yuma / Yuma Regional Communications System	White Mountain Apache Fire and Rescue
Clifton Police Department	Yavapai County
Crown King Fire District	Yavapai County Sheriff
Eloy Fire District	Yuma County Public Health Services District
Flagstaff Police Department	Yuma Fire
Gila County Emergency Management	Yuma Police Department
Guardian Air and Guardian Medical Transport	Tucson Police Department
La Paz County	Fort Mojave Telecommunications
Maricopa County	White Mountain Apache Police Department
Mesa Fire / Medical Department	Quechan Police Department
Mesa Police Department	Hopi Tribe
Mohave County Department of Public Health	Salt River Pima Maricopa Indian Community
National Weather Service	Hualapai Police Department
Navajo County Sheriff's Office	

Appendix 2 – Tribal Agencies

White Mountain Apache Fire & Rescue
Fort Mojave Telecommunications
White Mountain Apache Police Department
Quechan Police Department
Hopi Tribe
Salt River Pima Maricopa Indian Community
Hualapai Police Department